

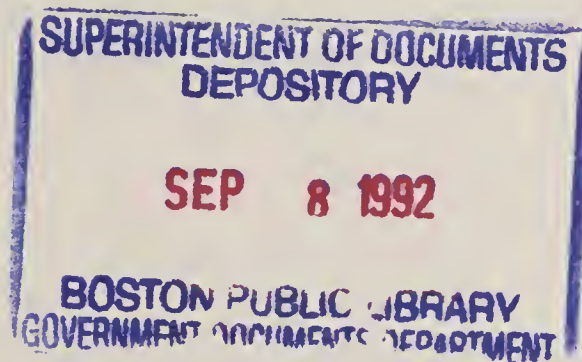
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# AVIATION MECHANIC GENERAL

## WRITTEN TEST BOOK



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

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but no later than  
September 1, 1994



**AVIATION MECHANIC GENERAL  
WRITTEN TEST BOOK**

**1992**

**U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
Office of Aviation System Standards**



## **PREFACE**

This written test book has been developed by the Federal Aviation Administration (FAA) to be used by FAA testing centers and FAA designated written test examiners for testing applicants in the following knowledge area:

### **Aviation Mechanic General**

Applicants may use this written test book as a study guide. It is issued as FAA-T-8080-10D, Aviation Mechanic General Written Test Book, and is available to the public from:

Superintendent of Documents  
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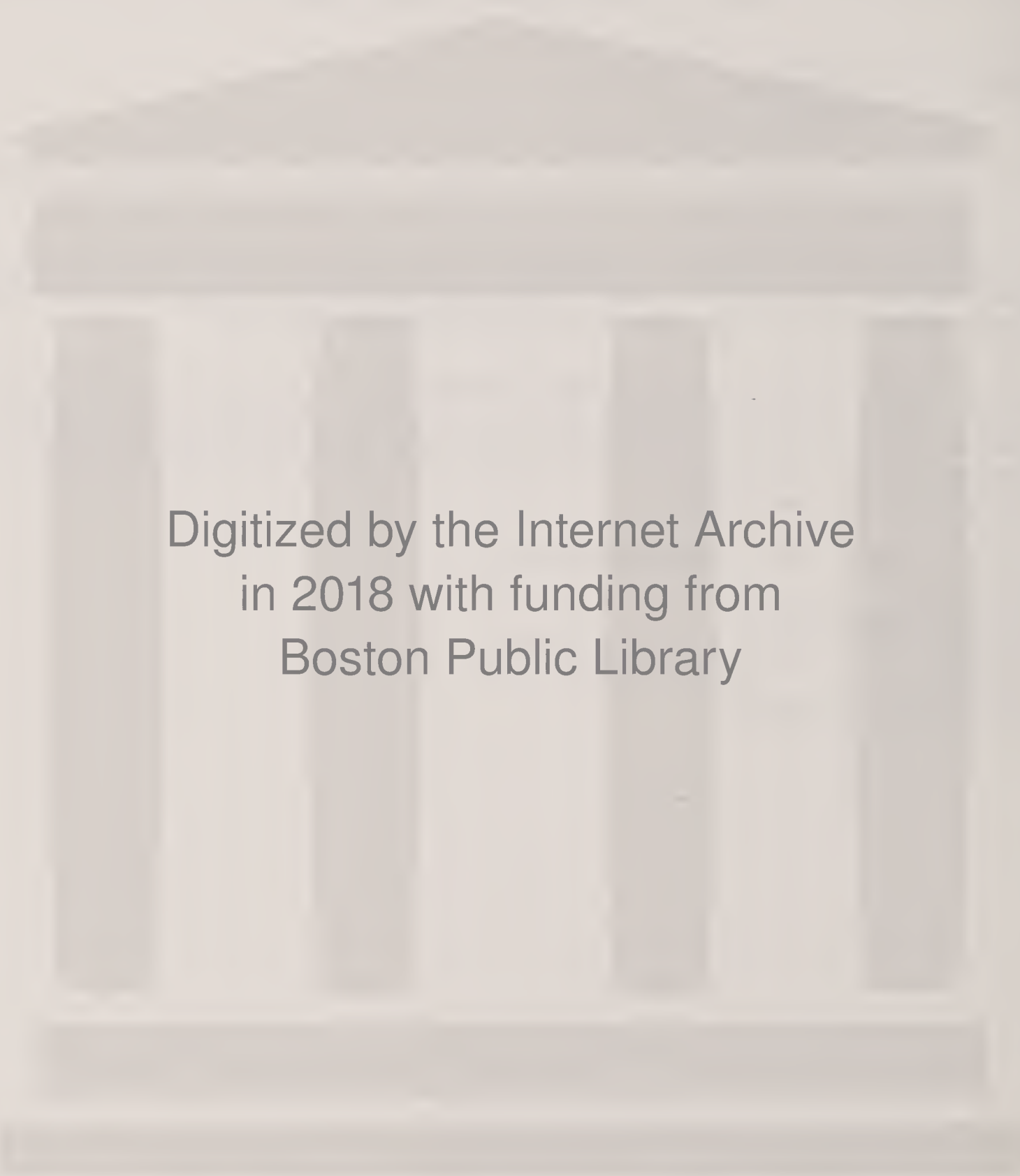
or from U.S. Government Printing Office bookstores located in major cities throughout the United States.

The questions included in this publication are predicated on regulations, references, principles, and practices that were valid at the time of publication. The question selection sheets prepared for use with this written test book are security items and are revised at frequent intervals.

The FAA does NOT publish, supply, or make available, the correct answers to questions included in this written test book. Students should determine the correct answers through research and study of appropriate subject material, by working with instructors, or by attending appropriate schools. The FAA is NOT responsible for either the content of commercial reprints of this written test book, or the accuracy of any answers they may supply.

Comments regarding this publication should be directed to:

Federal Aviation Administration  
Operations Standards Development Section, AVN-131  
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## **GENERAL INSTRUCTIONS**

### **MAXIMUM TIME ALLOWED FOR TEST: 2 HOURS**

Maximum time allowed for each test is based upon previous experience and educational statistics. This time is considered more than adequate for applicants with proper preparation and instruction.

#### **MATERIALS**

Materials to be used with this written test book when used for airman certification testing:

1. AC Form 8080-3, Airman Written Test Application, which includes the answer sheet.
2. Question selection sheet which identifies the questions to be answered.
3. Plastic overlay sheet which can be placed over electrical drawings, graphs, and charts for plotting purposes.

#### **TEST INSTRUCTIONS**

1. Read the instructions on page 1 of AC Form 8080-3, and complete page 4 of the form. Incomplete or erroneous personal information entered on this form delays the scoring process.
2. The questions in this written test book are numbered consecutively beginning with 7001. Refer to the question selection sheet to determine which questions to answer.
3. For each question number on the answer sheet, find the appropriate question in the written test book.
4. Mark your answer in the space provided for each question number on the answer sheet. Spaces 1, 2, 3, or 4 left unmarked will be counted by the computer scanner as a miss.
5. The test questions are of the multiple-choice type. Until revised, answer sheets contain selections listed as 1, 2, 3, and 4 and should be interpreted as A, B, C, and D respectively.
6. The supplementary material required to answer the questions will be found in appendix 2.
7. Read each question carefully and avoid hasty assumptions. Do not answer until you understand the question. Do not spend too much time on any one question. Answer all of the questions that you readily know and then reconsider those you find difficult. Be careful to make any necessary conversions.
8. If a regulation or procedure is changed after this written test book is printed, you will receive credit for the affected question.

**DO NOT USE THIS BOOK UNLESS IT CORRESPONDS  
WITH THE BOOK NUMBER ON THE TEST.**

***THE MINIMUM PASSING GRADE IS 70.***

## WARNING

§65.18 Written tests: cheating or other unauthorized conduct.

(a) Except as authorized by the Administrator, no person may—

(1) Copy, or intentionally remove, a written test under this Part;

(2) Give to another, or receive from another, any part or copy of that test;

(3) Give help on that test to, or receive help on that test from, any person during the period that test is being given;

(4) Take any part of that test in behalf of another person;

(5) Use any material or aid during the period that test is being given; or

(6) Intentionally cause, assist, or participate in any act prohibited by this paragraph.

(b) No person who commits an act prohibited by paragraph (a) of this section is eligible for any airman or ground instructor certificate or rating under this chapter for a period of one year after the date of that act. In addition, the commission of that act is a basis for suspending or revoking any airman or ground instructor certificate or rating held by that person.



# INTRODUCTION TO THE AVIATION MECHANIC GENERAL WRITTEN TEST BOOK

This written test book presents the FAA Aviation Mechanic General written tests. The requirements for a mechanic certificate and ratings, and the privileges, limitations, and general operating rules for certificated mechanics are prescribed in Federal Aviation Regulation (FAR) Part 65, Certification: Airmen Other Than Flight Crewmembers. Any person who applies and meets the requirements is entitled to a mechanic certificate.

Question selection sheets are used in conjunction with this written test book to administer the proper written test to each applicant. Each test is constructed from the questions included in this written test book.

The written test book is scheduled for revision each 24 months. Associated question selection sheets will be revised periodically, as required.

## ***Testing and Scoring***

The written test may be taken at FAA testing centers, FAA written test examiner's facilities, or other designated places.

The applicant is issued a "clean copy" of this written test book, an appropriate question selection sheet indicating the specific questions to be answered, and AC Form 8080-3, Airman Written Test Application, which includes the answer sheet. The written test book contains all supplementary material required to answer the questions. Supplementary material is located in appendix 2.

Instructions for completing the test are contained on page vii of this written test book.

Upon completion of the test, the applicant must surrender the issued written test book, question selection sheet, answer sheet, and any papers used for computations or notations to the monitor before leaving the test room.

The answer sheet is sent to the Mike Monroney Aeronautical Center in Oklahoma City, Oklahoma, where it is scored by computer. The applicant is then issued AC Form 8080-2, Airman Written Test Report. This form will list the test score and subject matter knowledge codes referencing the subjects in which the

applicant is deficient. Retain AC Form 8080-2 to be presented for oral and practical testing, or for retesting in the event of written test failure.

The written test subject matter knowledge codes are then matched to the corresponding subject matter knowledge areas published in appendix 1 of this written test book. The applicant should review those subject areas until proficient. The applicant must obtain a written statement from an appropriately certificated mechanic stating that he/she has satisfactory knowledge of the subject areas shown to be deficient on AC Form 8080-2. In addition, the applicant may be retested in those subject areas by the mechanic.

The applicant should be aware that a subject matter code on AC Form 8080-2 appears only once even though more than one question may have been missed in that subject area. Therefore, the number of subject matter codes on AC Form 8080-2 may not represent the number of questions missed on the test.

When taking the test, the applicant should keep the following points in mind:

1. Answer each question in accordance with the latest regulations and procedures.
2. Read each question carefully before looking at the possible answers. You should clearly understand the problem before attempting to solve it.
3. After formulating an answer, determine which of the alternatives most nearly corresponds with that answer. The answer chosen should completely resolve the problem.
4. From the answers given, it may appear that there is more than one possible answer; however, there is only one answer that is correct and complete. The other answers are either incomplete or are derived from popular misconceptions.
5. If a certain question is difficult for you, it is best to proceed to other questions. After you answer the less difficult questions, return to those which gave you difficulty. Be sure to indicate on your question selection sheet the questions to which you wish to return.

6. When solving a calculator problem, select the answer nearest your solution. If you have solved it correctly, your answer will be closer to the correct answer than to any of the other choices.

7. To aid in scoring, enter personal data in the appropriate spaces on the test answer sheet in a complete and legible manner. Be sure to enter the test number exactly as printed on the question selection sheet.

***Retesting after Failure—FAR Section 65.19***

An applicant for a written, oral, or practical test for a certificate and rating, or for an additional rating under this part, may apply for retesting—

(a) After 30 days after the date the applicant failed the test; or

(b) Before the 30 days have expired if the applicant presents a signed statement from an airman holding the certificate and rating sought by the applicant, certifying that the airman has given the applicant additional instruction in each of the subjects failed and that the airman considers the applicant ready for retesting.



## QUESTIONS

**7001.** The working voltage of a capacitor in an ac circuit should be

- A— .707 times the applied voltage.
- B— at least 50 percent greater than the highest applied voltage.
- C— the same as, or slightly greater than, the applied voltage.
- D— at least 80 percent greater than the applied voltage.

**7002.** The term that describes the combined resistive forces in an ac circuit is

- A— resistance.
- B— capacitance.
- C— total resistance.
- D— impedance.

**7003.** If a circuit contains 10 ohms of resistance, 20 ohms of inductive reactance, and 30 ohms of capacitive reactance, it is said to be

- A— inductive.
- B— in resonance.
- C— resistive.
- D— capacitive.

**7004.** The opposition offered by a coil to the flow of ac is called (disregard resistance)

- A— conductivity.
- B— impedance.
- C— reluctance.
- D— inductive reactance.

**7005.** An increase in which of the following factors will cause an increase in the inductive reactance of a circuit?

- A— Inductance and frequency.
- B— Capacitance and voltage.
- C— Resistance and voltage.
- D— Resistance and capacitive reactance.

**7006.** When the capacitive reactance in an ac electrical circuit is equal to the inductive reactance, the circuit is said to be

- A— in correct voltage phase angle.
- B— in correct current phase angle.
- C— out of phase.
- D— resonant.

**7007.** In an ac circuit, the effective voltage

- A— is equal to the maximum instantaneous voltage.
- B— is greater than the maximum instantaneous voltage.
- C— may be greater than, or less than, the maximum instantaneous voltage.
- D— is less than the maximum instantaneous voltage.

**7008.** The amount of electricity a capacitor can store is directly proportional to the

- A— distance between the plates and inversely proportional to the plate area.
- B— plate area and is not affected by the distance between the plates.
- C— plate area and inversely proportional to the distance between the plates.
- D— distance between the plates and is not affected by the plate area.

**7009.** A transformer with a step-up ratio of 5 to 1 has a primary voltage of 24 volts and a secondary amperage of 0.20 ampere. What is the primary amperage (disregard losses)?

- A— 1 ampere.
- B— 4.8 amperes.
- C— 0.40 ampere.
- D— Cannot be determined from the information given.

**7010.** Unless otherwise specified, any values given for current or voltage in an ac circuit are assumed to be

- A— average values.
- B— instantaneous values.
- C— effective values.
- D— maximum values.

**7011.** Which requires the most electrical power during operation?

(Note: 1 horsepower = 746 watts.)

- A— A 12-volt motor requiring 8 amperes.
- B— Four 30-watt lamps in a 12-volt parallel circuit.
- C— Two lights requiring 3 amperes each in a 24-volt parallel system.
- D— A 1/10-horsepower, 24-volt motor which is 75 percent efficient.

**7012.** How much power must a 24-volt generator furnish to a system which contains the following loads?

UNIT	RATING
One motor (75 percent efficient) . . . . .	1/5 hp
Three position lights . . . . .	20 watts each
One heating element . . . . .	5 amp
One anticollision light . . . . .	3 amp

(Note: 1 horsepower = 746 watts.)

- A— 18.75 watts.
- B— 402 watts.
- C— 385 watts.
- D— 450 watts.

**7013.** A 12-volt electric motor has 1,000 watts input and 1 horsepower output. Maintaining the same efficiency, how much input power will a 24-volt, 1-horsepower electric motor require?

(Note: 1 horsepower = 746 watts.)

- A— 1,000 watts.
- B— 2,000 watts.
- C— 500 watts.
- D— Cannot be determined from the information given.

**7014.** How many amperes will a 28-volt generator be required to supply to a circuit containing five lamps in parallel, three of which have a resistance of 6 ohms each and two of which have a resistance of 5 ohms each?

- A— 1.11 amperes.
- B— 1 ampere.
- C— 0.9 ampere.
- D— 25.23 amperes.

**7015.** The wattage rating of a carbon resistor is determined by

- A— a gold band.
- B— a silver band.
- C— the size of the resistor.
- D— a red band.

**7016.** The potential difference between two conductors which are insulated from each other is measured in

- A— ohms.
- B— volts.
- C— amperes.
- D— coulombs.

**7017.** A 24-volt source is required to furnish 48 watts to a parallel circuit consisting of four resistors of equal value. What is the voltage drop across each resistor?

- A— 12 volts.
- B— 6 volts.
- C— 3 volts.
- D— 24 volts.

**7018.** When calculating power in a reactive or inductive ac circuit, the true power is

- A— more than the apparent power.
- B— more than the apparent power in a reactive circuit and less than the apparent power in an inductive circuit.
- C— less than the apparent power in a reactive circuit and more than the apparent power in an inductive circuit.
- D— less than the apparent power.

**7019.** (Refer to figure 1.) How much power is being furnished to the circuit?

- A— 575 watts.
- B— 1322.5 watts.
- C— 2875 watts.
- D— 2645 watts.



**7020.** (Refer to figure 2.) What is the impedance of an ac-series circuit consisting of an inductor with a reactance of 10 ohms, a capacitor with a reactance of 4 ohms, and a resistor with a resistance of 8 ohms?

- A— 22 ohms.
- B— 5.29 ohms.
- C— 10 ohms.
- D— 100 ohms.

**7021.** (Refer to figure 3.) If resistor  $R_5$  is disconnected at the junction of  $R_4$  and  $R_3$  as shown, what will the ohmmeter read?

- A— 9 ohms.
- B— 2.76 ohms.
- C— 3 ohms.
- D— 12 ohms.

**7022.** (Refer to figure 4.) If resistor  $R_3$  is disconnected at terminal D, what will the ohmmeter read?

- A— Infinite resistance.
- B— 0 ohm.
- C— 10 ohms.
- D— 20 ohms.

**7023.** (Refer to figure 5.) With an ohmmeter connected into the circuit as shown, what will the ohmmeter read?

- A— 20 ohms.
- B— Infinite resistance.
- C— 0 ohm.
- D— 10 ohms.

**7024.** (Refer to figure 6.) How many instruments (voltmeters and ammeters) are installed correctly?

- A— Three.
- B— One.
- C— Two.
- D— Four.

**7025.** The correct way to connect a test voltmeter in a circuit is

- A— in series with a unit.
- B— between source voltage and the load.
- C— in parallel with a unit.
- D— to place one lead on either side of the fuse.

**7026.** Which term means .001 ampere?

- A— Microampere.
- B— Picoampere.
- C— Kiloampere.
- D— Milliampere.

**7027.** To determine the value of a certain resistor, the ohmmeter is set at the RX10 range. If the meter reading is 50, what is the value of the resistor?

- A— 5,000 ohms.
- B— 500 ohms.
- C— 50 ohms.
- D— 0.5 ohms.

**7028.** A 14-ohm resistor is to be installed in a series circuit carrying .05 ampere. How much power will the resistor be required to dissipate?

- A— At least .70 milliwatt.
- B— At least 35 milliwatts.
- C— Less than .035 watt.
- D— Less than .70 milliwatt.

**7029.** What is the maximum number of electrical wire terminals that can be installed on one stud?

- A— Four terminals per stud.
- B— Three terminals per stud.
- C— Two terminals per stud.
- D— As many terminals as you can stack on and still have the required number of threads showing through the nut.

**7030.** (Refer to figure 7.) What is the measured voltage of the series-parallel circuit between terminals A and B?

- A— 1.5 volts.
- B— 3.0 volts.
- C— 4.5 volts.
- D— 6.0 volts.

**7031.** The current in a 60-watt, 120-volt electric light bulb is

- A— 0.8 ampere.
- B— 2 amperes.
- C— 1/3 ampere.
- D— 1/2 ampere.

**7032.** Which requires the most electrical power?

(Note: 1 horsepower = 746 watts.)

- A— Four 30-watt lamps arranged in a 12-volt parallel circuit.
- B— A 12-volt landing gear retraction motor which requires 8 amperes when operating the landing gear.
- C— A 1/10-horsepower, 24-volt motor which is 75 percent efficient.
- D— A 24-volt anticollision light circuit consisting of two light assemblies which require 3 amperes each during operation.

**7033.** What unit is used to express electrical power?

- A— Coulomb.
- B— Volt.
- C— Watt.
- D— Ampere.

**7034.** What is the operating resistance of a 30-watt light bulb designed for a 28-volt system?

- A— 30 ohms.
- B— 1.07 ohms.
- C— 26 ohms.
- D— 0.93 ohm.

**7035.** Which statement is correct when made in reference to a parallel circuit?

- A— The current is equal in all portions of the circuit.
- B— The current in amperes is the product of the EMF in volts times the total resistance of the circuit in ohms.
- C— The total current is equal to the sum of the currents through the individual branches of the circuit.
- D— The current in amperes can be found by dividing the EMF in volts by the sum of the resistors in ohms.

**7036.** Diodes are used in electrical power circuits primarily as

- A— current eliminators.
- B— circuit cutout switches.
- C— rectifiers.
- D— power transducer relays.

**7037.** Transfer of electrical energy from one conductor to another without the aid of electrical connections

- A— is called induction.
- B— is called airgap transfer.
- C— will cause excessive arcing and heat and as a result is impractical.
- D— is not possible.

**7038.** If three resistors of 3 ohms, 5 ohms, and 22 ohms are connected in series in a 28-volt circuit, how much current will flow through the 3-ohm resistor?

- A— 9.3 amperes.
- B— 1.05 amperes.
- C— 1.03 amperes.
- D— 0.93 ampere.

**7039.** A circuit has an applied voltage of 30 volts and a load consisting of a 10-ohm resistor in series with a 20-ohm resistor. What is the voltage drop across the 10-ohm resistor?

- A— 15 volts.
- B— 10 volts.
- C— 20 volts.
- D— 30 volts.

**7040.** (Refer to figure 8.) Find the total current flowing in the wire between points C and D.

- A— 6.0 amperes.
- B— 2.4 amperes.
- C— 3.0 amperes.
- D— 0.6 ampere.

**7041.** (Refer to figure 8.) Find the voltage across the 8-ohm resistor.

- A— 2.4 volts.
- B— 12 volts.
- C— 20.4 volts.
- D— 24 volts.

**7042.** (Refer to figure 9.) Find the total resistance of the circuit.

- A— 16 ohms.
- B— 10.4 ohms.
- C— 2.6 ohms.
- D— 21.2 ohms.



**7043.** Which is correct in reference to electrical resistance?

- A— Two electrical devices will have the same combined resistance if they are connected in series as they will have if connected in parallel.
- B— If one of three bulbs in a parallel lighting circuit is removed, the total resistance of the circuit will become greater.
- C— An electrical device that has a high resistance will use more power than one with a low resistance with the same applied voltage.
- D— A 5-ohm resistor in a 12-volt circuit will use less current than a 10-ohm resistor in a 24-volt circuit.

**7044.** What happens to the current in a voltage step-up transformer with a ratio of 1 to 4?

- A— The current is stepped down by a 1 to 4 ratio.
- B— The current is stepped up by a 1 to 4 ratio.
- C— The current does not change.
- D— The current is changed at half the voltage ratio.

**7045.** (Refer to figure 10.) Determine the total current flow in the circuit.

- A— 0.2 ampere.
- B— 1.4 amperes.
- C— 0.4 ampere.
- D— 0.8 ampere.

**7046.** (Refer to figure 11.) The total resistance of the circuit is

- A— 25 ohms.
- B— 35 ohms.
- C— 37 ohms.
- D— 17 ohms.

**7047.** Which of these will cause the resistance of a conductor to decrease?

- A— Decrease the length or the cross-sectional area.
- B— Increase the length or the cross-sectional area.
- C— Decrease the length or increase the cross-sectional area.
- D— Increase the length or decrease the cross-sectional area.

**7048.** Through which material will magnetic lines of force pass the most readily?

- A— Copper.
- B— Iron.
- C— Aluminum.
- D— Titanium.

**7049.** A 48-volt source is required to furnish 192 watts to a parallel circuit consisting of three resistors of equal value. What is the value of each resistor?

- A— 36 ohms.
- B— 4 ohms.
- C— 8 ohms.
- D— 12 ohms.

**7050.** Which is correct concerning a parallel circuit?

- A— Total resistance will be smaller than the smallest resistor.
- B— Total resistance will decrease when one of the resistances is removed.
- C— Total voltage drop is the same as the total resistance.
- D— Total amperage remains the same, regardless of the resistance.

**7051.** The voltage drop in a conductor of known resistance is dependent on

- A— the voltage of the circuit.
- B— the amount and thickness of wire insulation.
- C— only the resistance of the conductor and does not change with a change in either voltage or amperage.
- D— the amperage of the circuit.

**7052.** An electric motor malfunctions, causing it to overheat, which will cause an incorporated thermal switch to

- A— prevent an open circuit.
- B— break the circuit.
- C— close the circuit.
- D— break the circuit when cooled.

**7053.** (Refer to figure 12.) With the landing gear retracted, the red indicator light will not come on if an open occurs in wire

- A— No. 19.
- B— No. 7.
- C— No. 16.
- D— No. 17.

**7054.** (Refer to figure 12.) The No. 7 wire is used to

- A— open the DOWN indicator light circuit when the landing gear is retracted.
- B— complete the PUSH-TO-TEST circuit.
- C— open the UP indicator light circuit when the landing gear is retracted.
- D— close the UP indicator light circuit when the landing gear is retracted.

**7055.** (Refer to figure 12.) When the landing gear is down, the green light will not come on if an open occurs in wire

- A— No. 7.
- B— No. 6.
- C— No. 16.
- D— No. 17.

**7056.** (Refer to figure 13.) What will be the effect if the PCO relay fails to operate when the left-hand tank is selected?

- A— The fuel pressure crossfeed valve will not open.
- B— The fuel tank crossfeed valve will open.
- C— The fuel tank crossfeed valve open light will illuminate.
- D— The fuel pressure crossfeed valve open light will not illuminate.

**7057.** (Refer to figure 13.) The TCO relay will operate if 24-volts dc is applied to the bus and the fuel tank selector is in the

- A— right-hand tank position.
- B— crossfeed position.
- C— left-hand tank position.
- D— normal position.

**7058.** (Refer to figure 13.) With power to the bus and the fuel selector switched to the right-hand tank, how many relays in the system are operating?

- A— Three.
- B— One.
- C— Two.
- D— Four.

**7059.** (Refer to figure 13.) When electrical power is applied to the bus, which relays are energized?

- A— PCO and TCC.
- B— PCC and TCC.
- C— TCC and TCO.
- D— PCO and PCC.

**7060.** (Refer to figure 13.) Energize the circuit with the fuel tank selector switch selected to the left-hand position. Using the schematic, identify the switches that will change position.

- A— 5, 11, 12, 13, 15, 9, 10.
- B— 5, 6, 3, 7, 11, 13.
- C— 5, 6, 11, 15, 12, 13, 16.
- D— 5, 7, 11, 15.

**7061.** (Refer to figure 14.) Which of the components is a potentiometer?

- A— 4.
- B— 5.
- C— 3.
- D— 11.

**7062.** (Refer to figure 14.) What electrical symbol is represented at number 5?

- A— Fixed capacitor.
- B— Fixed resistor.
- C— Variable resistor.
- D— Variable capacitor.

**7063.** (Refer to figure 15.) When the landing gears are up and the throttles are retarded, the warning horn will not sound if an open occurs in wire

- A— No. 4.
- B— No. 2.
- C— No. 9.
- D— No. 10.



**7064.** (Refer to figure 15.) The control valve switch must be placed in the neutral position when the landing gears are down to

- A— permit the test circuit to operate.
- B— provide a ground for the red light.
- C— prevent the warning horn from sounding when the throttles are closed.
- D— remove the ground from the green light.

**7065.** (Refer to figure 16.) Under which condition will a ground be provided for the warning horn through both gear switches when the throttles are closed?

- A— Right gear up and left gear down.
- B— Anytime the gears malfunction.
- C— Both gears up and the control valve out of neutral.
- D— Left gear up and right gear down.

**7066.** (Refer to figure 16.) When the throttles are retarded with only the right gear down, the warning horn will not sound if an open occurs in wire

- A— No. 5.
- B— No. 13.
- C— No. 8.
- D— No. 6.

**7067.** (Refer to figure 16.) When the landing gears are up and the throttles are retarded, the warning horn will not sound if an open occurs in wire

- A— No. 5.
- B— No. 7.
- C— No. 13.
- D— No. 6.

**7068.** Schematic diagrams indicate the location of individual components in the aircraft

- A— with aircraft station numbers of each component.
- B— on the title block by Federal stock number.
- C— with respect to each other within the system.
- D— with detail drawings of each component.

**7069.** When referring to an electrical circuit diagram, what point is considered to be at zero voltage?

- A— The ground reference.
- B— The current limiter.
- C— The fuse.
- D— The switch.

**7070.** (Refer to figure 17.) Troubleshooting an open circuit with a voltmeter as shown in this circuit will

- A— permit current to flow and illuminate the lamp.
- B— create a low resistance path and the current flow will be greater than normal.
- C— restrict current flow and no voltage will appear on the voltmeter.
- D— permit the battery voltage to appear on the voltmeter.

**7071.** (Refer to figure 18.) Which symbol represents a variable resistor?

- A— 3.
- B— 1.
- C— 2.
- D— 4.

**7072.** A lead-acid battery with 12 cells connected in series (no-load voltage = 2.1 volts per cell) furnishes 10 amperes to a load of 2-ohms resistance. The internal resistance of the battery in this instance is

- A— 0.52 ohm.
- B— 2.52 ohms.
- C— 5.0 ohms.
- D— 20 ohms.

**7073.** If an inspection discloses that a considerable amount of acid from a lead-acid battery has been spilled in the general area of the battery compartment, which procedure should be followed?

- A— Neutralize the spilled battery acid by applying sodium bicarbonate solution to the affected area followed by a water rinse.
- B— Apply sodium bicarbonate in powder form to the affected area.
- C— Apply water to the affected area until the spilled battery acid turns cloudy white.
- D— Wipe the affected area with an oil-dampened cloth.

**7074.** Which statement regarding the hydrometer reading of a lead-acid storage battery electrolyte is true?

- A— The hydrometer reading does not require a temperature correction if the electrolyte temperature is 80 °F.
- B— A specific gravity correction should be subtracted from the hydrometer reading if the electrolyte temperature is above 20 °F.
- C— A specific gravity correction should be added to the hydrometer reading if the electrolyte temperature is below 0 °F.
- D— The hydrometer reading will give a true indication of the capacity of the battery regardless of the electrolyte temperature.

**7075.** A fully charged lead-acid battery will not freeze until extremely low temperatures are reached because

- A— the acid is in the plates, thereby increasing the specific gravity of the solution.
- B— most of the acid is in the solution.
- C— the increased internal resistance generates sufficient heat to prevent freezing.
- D— gases which act as an insulator are always present above the solution.

**7076.** What determines the amount of current which will flow through a battery while it is being charged by a constant voltage source?

- A— The number of cells in the battery.
- B— The total plate area of the battery.
- C— The state-of-charge of the battery.
- D— The ampere-hour capacity of the battery.

**7077.** When charging several batteries at the same time using a constant current-type charger,

- A— the batteries can be connected in series with each other and the charger, regardless of their voltage ratings.
- B— all batteries of the same ampere-hour capacity can be connected in series with each other and parallel to the charger.
- C— 24-volt and 12-volt batteries cannot be charged at the same time unless suitable voltage-dropping resistors are placed in the line to the 24-volt batteries.
- D— the batteries can be connected parallel to the charger, but two or more batteries of the same voltage rating should be connected in series with each other.

**7078.** The method used to rapidly charge a nickel-cadmium battery utilizes

- A— constant current and constant voltage.
- B— varying current and varying voltage.
- C— constant current and varying voltage.
- D— constant voltage and varying current.

**7079.** The electrolyte used in the nickel-cadmium battery is a

- A— potassium hydroxide solution.
- B— hydrochloric acid solution.
- C— sulfuric acid solution.
- D— potassium peroxide solution.

**7080.** Most aircraft storage batteries are rated according to

- A— open-circuit voltage and closed-circuit voltage.
- B— voltage and ampere-hour capacity.
- C— the maximum number of volt-amperes (power) the battery can furnish to a load.
- D— battery voltage and volts per cell.

**7081.** If an aircraft ammeter shows a full charging rate but the battery remains in a discharged state, the most likely cause is

- A— a shorted battery relay.
- B— an internally shorted battery.
- C— a shorted generator field circuit.
- D— a shorted circuit breaker in the battery master relay circuit.

**7082.** Which condition is an indication of improperly torqued cell link connections of a nickel-cadmium battery?

- A— Light spewing at the cell caps.
- B— Low temperature in the cells.
- C— Toxic and corrosive deposits of potassium carbonate crystals.
- D— Heat or burn marks on the hardware.

**7083.** The presence of small amounts of potassium carbonate deposits on the top of nickel-cadmium battery cells that have been in service for a time is an indication of

- A— normal operation.
- B— excessive gassing.
- C— electrolyte contamination.
- D— excessive plate sulfation.



**7084.** The servicing and charging of nickel-cadmium and lead-acid batteries together in the same service area is likely to result in

- A— normal battery service life.
- B— thermal runaway in the nickel-cadmium batteries.
- C— increased explosion and fire hazard.
- D— contamination of both types of batteries.

**7085.** The electrolyte of a nickel-cadmium battery is the lowest when the battery is

- A— being charged.
- B— fully charged.
- C— in a discharged condition.
- D— under load condition.

**7086.** The end-of-charge voltage of a 19-cell nickel-cadmium battery, measured while still on charge,

- A— must be 1.2 to 1.3 volts per cell.
- B— must be 1.4 volts per cell.
- C— depends upon its temperature and the method used for charging.
- D— must be 1.8 to 1.9 volts per cell.

**7087.** Nickel-cadmium batteries which are stored for a long period of time will show a low fluid level because the

- A— fluid evaporates through the vents.
- B— battery is fully charged.
- C— fluid level was not periodically replenished.
- D— electrolyte becomes absorbed in the plates.

**7088.** How can the state-of-charge of a nickel-cadmium battery be determined?

- A— By measuring the specific gravity of the electrolyte.
- B— By a measured discharge.
- C— By the temperature of the plates.
- D— By the level of the electrolyte.

**7089.** What may result if water is added to a nickel-cadmium battery when it is not fully charged?

- A— The cell temperatures will run too low for proper output.
- B— The electrolyte will be absorbed by the plates during the charging cycle.
- C— No adverse results since water may be added anytime.
- D— Excessive spewing will occur during the charging cycle.

**7090.** In nickel-cadmium batteries, a rise in cell temperature

- A— causes an increase in internal resistance.
- B— has no effect on internal resistance.
- C— causes a decrease in internal resistance.
- D— increases cell voltage.

**7091.** When a charging current is applied to a nickel-cadmium battery, the cells emit gas only

- A— toward the end of the charging cycle.
- B— at the start of the charging process.
- C— when the electrolyte level is low.
- D— if they are defective.

**7092.** What type of line is normally used in a mechanical drawing or blueprint to represent an edge or object not visible to the viewer?

- A— Medium-weight dashed line.
- B— Light solid line.
- C— Alternate short and long heavy dashes.
- D— Zigzag or wavy line.

**7093.** (Refer to figure 19.) In the isometric view of a typical aileron balance weight, identify the view indicated by the arrow.

- A— 1.
- B— 2.
- C— 4.
- D— 3.

**7094.** (1) A detail drawing is a description of a single part.

(2) An assembly drawing is a description of an object made up of two or more parts.

Regarding the above statements,

- A— only No. 1 is true.
- B— only No. 2 is true.
- C— neither No. 1 nor No. 2 is true.
- D— both No. 1 and No. 2 are true.

**7095.** (Refer to figure 20.) Identify the bottom view of the object shown.

- A— 1.
- B— 3.
- C— 2.
- D— 4.

**7096.** What is a fuselage station number?

- A— A measurement in inches from the datum or some other point chosen by the manufacturer.
- B— A zone number used to locate a particular point.
- C— A measurement in inches from the centerline or zero station of the aircraft.
- D— A measurement in inches which always starts at the nose of the aircraft.

**7097.** Which statement is true regarding an orthographic projection?

- A— There are always at least two views.
- B— It could have as many as eight views.
- C— It must be accompanied with a pictorial drawing.
- D— One-view, two-view, and three-view drawings are the most common.

**7098.** (Refer to figure 21.) Identify the left side view of the object shown.

- A— 1.
- B— 2.
- C— 3.
- D— 4.

**7099.** A line used to show an edge which is not visible is a

- A— position line.
- B— phantom line.
- C— hidden line.
- D— break line.

**7100.** (Refer to figure 22.) Identify the bottom view of the object.

- A— 2.
- B— 1.
- C— 3.
- D— 4.

**7101.** (1) Schematic diagrams indicate the location of individual components in the aircraft.

(2) Schematic diagrams indicate the location of components with respect to each other within the system.

Regarding the above statements,

- A— only No. 1 is true.
- B— both No. 1 and No. 2 are true.
- C— only No. 2 is true.
- D— neither No. 1 nor No. 2 is true.

**7102.** (Refer to figure 23.) What are the proper procedural steps for sketching repairs and alterations?

- A— 3, 1, 4, 2.
- B— 2, 3, 1, 4.
- C— 4, 2, 3, 1.
- D— 1, 3, 4, 2.

**7103.** Which statement is applicable when using a sketch for making a part?

- A— The sketch may be used only if supplemented with three-view orthographic projection drawings.
- B— The sketch must show all information to manufacture the part.
- C— The sketch need not show all necessary construction details.
- D— A part is never made solely from a sketch.



**7104.** (Refer to figure 24.) What is the next step required for a working sketch of the illustration?

- A— Darken the object outlines.
- B— Sketch extension and dimension lines.
- C— Add notes, dimensions, title, and date.
- D— Sketch at least two more views of the object.

**7105.** In orthographic projection drawings, it is often possible to portray an object clearly by the use of three views. When three-view projection is used, which views are usually shown?

- A— Top, front, and bottom.
- B— Front, left side, and right side.
- C— Top, front, and right side.
- D— Front, back, and left side.

**7106.** What should be the first step of the procedure in sketching an aircraft wing skin repair?

- A— Draw heavy guidelines.
- B— Lay out the repair.
- C— Draw the details.
- D— Block in the views.

**7107.** (1) According to FAR Part 91, repairs to an aircraft skin should have a detailed dimensional sketch included in the permanent records.

(2) On occasion, a mechanic may need to make a simple sketch of a proposed repair to an aircraft, a new design, or a modification.

Regarding the above statements,

- A— only No. 1 is true.
- B— only No. 2 is true.
- C— both No. 1 and No. 2 are true.
- D— neither No. 1 nor No. 2 is true.

**7108.** What are the six possible views of an object in orthographic projection?

- A— Front, top, inside, rear, right side, and left side.
- B— Front, outside, bottom, rear, right side, and left side.
- C— Front, top, bottom, rear, right side, and left side.
- D— Front, top, bottom, inside, right side, and left side.

**7109.** Working drawings may be divided into three classes. They are:

- A— title drawings, installation drawings, and assembly drawings.
- B— detail drawings, assembly drawings, and installation drawings.
- C— orthographic projection drawings, pictorial drawings, and detail drawings.
- D— detail drawings, pictorial drawings, and assembly drawings.

**7110.** A sketch is frequently drawn for use in

- A— manufacturing a replacement part.
- B— training of an airframe mechanic.
- C— identifying the person drawing the sketch.
- D— troubleshooting.

**7111.** (1) Any material section-line symbol may be used in the drawing of a part, if the material specification is indicated in a note.

(2) The symbol for cast iron may be used for sectioning if the material specifications are shown elsewhere on the drawing.

Regarding the above statements,

- A— only No. 1 is true.
- B— only No. 2 is true.
- C— both No. 1 and No. 2 are true.
- D— neither No. 1 nor No. 2 is true.

**7112.** (Refer to figure 25.) Which material section-line symbol indicates cast iron?

- A— 1.
- B— 2.
- C— 3.
- D— 4.

**7113.** (Refer to figure 26.) What is the dimension of the chamfer?

- A— 0.0625 X 45°.
- B— 0.0625 R.
- C— 0.4062 R spherical.
- D— 0.5000 diameter.

7114. (Refer to figure 26.) What is the maximum diameter of the hole for the clevis pin?

- A— 0.3175.
- B— 0.3125.
- C— 0.3130.
- D— 0.31255.

7115. (Refer to figure 26.) What would be the minimum diameter of 4130 round stock required for the construction of the clevis that would produce a machined surface?

- A— 55/64 inch.
- B— 1 inch.
- C— 7/8 inch.
- D— 1-1/16 inches.

7116. (Refer to figure 26.) Using the information, what size drill would be required to drill the clevis bolthole?

- A— 21/64 inch.
- B— 19/64 inch.
- C— 5/16 inch.
- D— 9/32 inch.

7117. (Refer to figure 27.) Identify the bottom view of the object shown.

- A— 1.
- B— 2.
- C— 3.
- D— 4.

7118. What are the means of conveying measurements through the medium of drawings?

- A— Dimensions.
- B— Tolerances.
- C— Edge distances.
- D— Bend allowances.

7119. (Refer to figure 28.) Identify the extension line.

- A— 3.
- B— 1.
- C— 2.
- D— 4.

7120. (Refer to figure 29.) The diameter of the holes in the finished object is

- A— 3/4 inch.
- B— 31/64 inch.
- C— 1 inch.
- D— 1/2 inch.

7121. Zone numbers on aircraft blueprints are

- A— used to locate parts, sections, and views on large drawings.
- B— used to indicate different sections of the aircraft.
- C— used to locate parts in the aircraft.
- D— not used on working drawings.

7122. Schematic diagrams are used for

- A— locating components in the aircraft.
- B— troubleshooting.
- C— identifying items in the aircraft.
- D— manufacturing aircraft parts.

7123. When reading a blueprint, a dimension is given as 4.387 inches + .005 - .002. Which statement is true?

- A— The maximum acceptable size is 4.385 inches.
- B— The minimum acceptable size is 4.385 inches.
- C— The allowance is .004.
- D— The maximum acceptable size is 4.389 inches.

7124. What is the allowable manufacturing tolerance for a bushing where the outside dimensions shown on the blueprint are:

$$1.0625 + .0025 - .0003?$$

- A— .0028.
- B— 1.0650.
- C— 1.0647.
- D— .0025.

7125. A hydraulic system schematic drawing would indicate the

- A— specific location of the individual components within the aircraft.
- B— direction of fluid flow through the system.
- C— type and quantity of the hydraulic fluid.
- D— part or model numbers of the individual components.



**7126.** (Refer to figure 30.) The vertical distance between the top of the plate and the bottom of the lowest 15/64-inch hole is

- A— 2.250.
- B— 2.242.
- C— 2.367.
- D— 3.312.

**7127.** (1) A measurement should not be scaled from an aircraft print because the paper shrinks or stretches when the print is made.

(2) When a detail drawing is made, it is carefully and accurately drawn to scale, and is dimensioned.

Regarding the above statements,

- A— only No. 1 is true.
- B— only No. 2 is true.
- C— both No. 1 and No. 2 are true.
- D— neither No. 1 nor No. 2 is true.

**7128.** The drawings often used in illustrated parts manuals are

- A— exploded view drawings.
- B— block drawings.
- C— section drawings.
- D— detail drawings.

**7129.** A drawing in which the subassemblies or parts are shown as brought together on the aircraft is called

- A— a sectional drawing.
- B— a detail drawing.
- C— a block drawing.
- D— an installation drawing.

**7130.** What type of drawing shows the wire size required for a particular installation?

- A— A block diagram.
- B— A schematic diagram.
- C— A wiring diagram.
- D— A pictorial diagram.

**7131.** What type of diagram is used to explain a principle of operation, rather than show the parts as they actually appear?

- A— A pictorial diagram.
- B— A schematic diagram.
- C— A block diagram.
- D— A wiring diagram.

**7132.** In the reading of aircraft blueprints;

(1) "Tolerance" is the amount of difference that is permissible between the dimensions of mating parts.

(2) "Allowance" is the difference between the extreme permissible dimensions of a part.

Regarding the above statements,

- A— only No. 1 is true.
- B— only No. 2 is true.
- C— both No. 1 and No. 2 are true.
- D— neither No. 1 nor No. 2 is true.

**7133.** (Refer to figure 31.) An aircraft reciprocating engine has a 1,830 cubic-inch displacement and develops 1,250 brake-horsepower at 2,500 RPM. What is the brake mean effective pressure?

- A— 217.
- B— 190.
- C— 205.
- D— 225.

**7134.** (Refer to figure 31.) An aircraft reciprocating engine has a 2,800 cubic-inch displacement, develops 2,000 brake-horsepower, and indicates 270 brake mean effective pressure. What is the engine speed (RPM)?

- A— 2,200.
- B— 2,100.
- C— 2,300.
- D— 2,400.

**7135.** (Refer to figure 31.) An aircraft reciprocating engine has a 2,800 cubic-inch displacement and develops 2,000 brake-horsepower at 2,200 RPM. What is the brake mean effective pressure?

- A— 257.5.
- B— 210.5.
- C— 242.5.
- D— 275.0.

**7136.** (Refer to figure 32.) Determine the cable size of a 40-foot length of single cable in free air, with a continuous rating, running from a bus to the equipment in a 28-volt system with a 15-ampere load and a 1-volt drop.

- A— No. 10.
- B— No. 11.
- C— No. 18.
- D— No. 6.

**7137.** (Refer to figure 32.) Determine the maximum length of a No. 16 cable to be installed from a bus to the equipment in a 28-volt system with a 25-ampere intermittent load and a 1-volt drop.

- A— 8 feet.
- B— 10 feet.
- C— 12 feet.
- D— 14 feet.

**7138.** (Refer to figure 32.) Determine the minimum wire size of a single cable in a bundle carrying a continuous current of 20 amperes 10 feet from the bus to the equipment in a 28-volt system with an allowable 1-volt drop.

- A— No. 12.
- B— No. 14.
- C— No. 16.
- D— No. 18.

**7139.** (Refer to figure 32.) Determine the maximum length of a No. 12 single cable that can be used between a 28-volt bus and a component utilizing 20 amperes continuous load in free air with a maximum acceptable 1-volt drop.

- A— 10.5 feet.
- B— 22.5 feet.
- C— 26.5 feet.
- D— 12.5 feet.

**7140.** (Refer to figure 33.) Determine the proper tension for a 1/8-inch cable (7 x 19) if the temperature is  $-30^{\circ}\text{F}$ .

- A— 30 pounds.
- B— 40 pounds.
- C— 48 pounds.
- D— 56 pounds.

**7141.** (Refer to figure 33.) Determine the proper tension for a 3/16-inch cable (7 x 19 extra flex) if the temperature is  $87^{\circ}\text{F}$ .

- A— 120 pounds.
- B— 135 pounds.
- C— 125 pounds.
- D— 140 pounds.

**7142.** (Refer to figure 34.) Determine how much fuel would be required for a 30-minute reserve operating at 2,300 RPM.

- A— 25.3 pounds.
- B— 27.5 pounds.
- C— 35.5 pounds.
- D— 49.8 pounds.

**7143.** (Refer to figure 34.) Determine the fuel consumption with the engine operating at cruise, 2,350 RPM.

- A— 49.2 pounds per hour.
- B— 51.2 pounds per hour.
- C— 55.3 pounds per hour.
- D— 58.7 pounds per hour.

**7144.** When computing weight and balance, an airplane is considered to be in balance when

- A— the average moment arm of the loaded airplane falls within its CG range.
- B— all moment arms of the plane fall within CG range.
- C— the movement of the passengers will not cause the moment arms to fall outside the CG range.
- D— the pilot is able to compensate for unbalance by use of control surface trim.

**7145.** What tasks are completed prior to weighing an aircraft to determine its empty weight?

- A— Remove all items on the aircraft equipment list; drain fuel and hydraulic fluid.
- B— Remove all items except those on the aircraft equipment list; drain fuel and hydraulic fluid.
- C— Remove all items on the aircraft equipment list; drain fuel, compute oil and hydraulic fluid weight.
- D— Remove all items except those on the aircraft equipment list; drain fuel and fill hydraulic reservoir.



**7146.** The useful load of an aircraft consists of the

- A— crew, usable fuel, passengers, and cargo.
- B— crew, usable fuel, oil, and fixed equipment.
- C— crew, passengers, usable fuel, oil, cargo, and fixed equipment.
- D— crew, powerplant, usable fuel, oil, cargo, and passengers.

**7147.** Before weighing an aircraft, it is necessary to become familiar with the aircraft CG range in the weight and balance information in

- A— the applicable Aircraft Specification or Type Certificate Data Sheet.
- B— AC 43.13-1A, chapter 12.
- C— AC 43.13-2A, chapter 11.
- D— the manufacturer's service bulletins and letters.

**7148.** In the theory of weight and balance, what is the name of the distance from the fulcrum to an object?

- A— Lever arm.
- B— Beam length.
- C— Balance arm.
- D— Fulcrum arm.

**7149.** When preparing an aircraft for weighing, which tank or reservoir is filled, unless otherwise noted in the aircraft manufacturer's instructions?

- A— Hydraulic reservoirs.
- B— Lavatory tanks.
- C— Wash water reservoirs.
- D— Drinking water reservoirs.

**7150.** (1) Private aircraft are required by regulations to be weighed periodically.

(2) Private aircraft are required to be weighed after making any alteration.

Regarding the above statements,

- A— neither No. 1 nor No. 2 is true.
- B— only No. 1 is true.
- C— only No. 2 is true.
- D— both No. 1 and No. 2 are true.

**7151.** What document will reference the required equipment needed to maintain validity of a standard Airworthiness Certificate?

- A— Manufacturer's maintenance manual.
- B— AC 43.13-1A.
- C— The aircraft's latest weight and balance information.
- D— Aircraft Specification or Type Certificate Data Sheet.

**7152.** What designates the location of the reference points for leveling aircraft on the ground for weighing purposes?

- A— Certificated A and P mechanic.
- B— FAA Administrator.
- C— Certificated repair station.
- D— Aircraft manufacturer.

**7153.** To obtain useful weight data for purposes of determining the CG, it is necessary that an aircraft be weighed

- A— with the main weighing points located within the normal CG limits.
- B— in a level flight attitude.
- C— with all items of useful load installed.
- D— with at least minimum fuel (1/12-gallon per METO horsepower) in the fuel tanks.

**7154.** What unit of measurement is used to designate arm in weight and balance computation?

- A— Pound/feet.
- B— Inches.
- C— Feet.
- D— Pound/inches.

**7155.** What determines whether the value of the moment is preceded by a plus (+) or a minus (-) sign in aircraft weight and balance?

- A— The addition or removal of weight.
- B— The location of the weight in reference to the datum.
- C— The result of a weight being added or removed and its location relative to the datum.
- D— The location of the datum in reference to the aircraft CG.

7156. The maximum weight of an aircraft is the

- A— empty weight plus crew, maximum fuel, cargo, and baggage.
- B— empty weight plus crew, passengers, and fixed equipment.
- C— empty weight plus useful load.
- D— empty weight plus crew and fixed equipment.

7157. When computing weight and balance for a helicopter, you must consider that

- A— the flight altitudes of a helicopter are such that the weight and balance is not critical.
- B— it is different from a fixed-wing aircraft, because the whirling rotor makes it difficult to locate the mean aerodynamic chord.
- C— the arm of tail-mounted components is subject to constant change.
- D— it is computed the same as a fixed-wing aircraft.

7158. What should be clearly indicated on the aircraft weighing form?

- A— Minimum allowable gross weight.
- B— Weight of unusable fuel.
- C— Weighing points.
- D— Zero fuel weight.

7159. If the reference datum line is placed at the nose of an airplane rather than at the firewall,

- A— all measurement arms will be in negative numbers.
- B— measurement of arms from the nose will involve less movement of cargo.
- C— all measurement arms will be in positive numbers.
- D— weight and balance computations will be somewhat more complex.

7160. Zero fuel weight is the

- A— dry weight plus the weight of full crew, passengers, and cargo.
- B— gross weight plus fuel, passengers, and cargo.
- C— basic operating weight, without crew, fuel, and cargo.
- D— maximum permissible weight of a loaded aircraft (passengers, crew, and cargo) without fuel.

7161. The empty weight of an airplane is determined by

- A— adding the gross weight on each weighing point and multiplying by the measured distance to the datum.
- B— adding the net weight of each weighing point and multiplying the measured distance to the datum.
- C— subtracting the tare weight from the scale reading and adding the weight of each weighing point.
- D— multiplying the measured distance from each weighing point to the datum times the sum of scale reading less the tare weight.

7162. When dealing with weight and balance of an aircraft, the term maximum weight is interpreted to mean the maximum

- A— weight of the empty aircraft.
- B— weight of the useful load.
- C— authorized weight of the aircraft and its contents.
- D— weight of all optional or special equipment that can be installed in the aircraft.

7163. The most important reason for aircraft weight and balance control in today's aircraft is

- A— efficiency in flight.
- B— to reduce noise levels.
- C— safety.
- D— to increase payloads.

7164. The useful load of an aircraft is the

- A— difference between the maximum gross weight and empty weight.
- B— difference between the net weight and total weight.
- C— sum of the empty weight and the maximum gross weight.
- D— sum of the net weight and total gross weight.

7165. When determining the empty weight of an aircraft, certificated under current airworthiness standards (FAR Part 23), the oil contained in the supply tank is considered

- A— a part of the empty weight.
- B— a part of the useful load.
- C— the same as the fluid contained in the water injection reservoir.
- D— a part of the payload.



**7166.** Improper loading of a helicopter which results in exceeding either the fore or aft CG limits is hazardous due to the

- A— reduction or loss of effective cyclic pitch control.
- B— override feature of the sprag clutch assembly.
- C— Coriolis effect being translated to the fuselage.
- D— reduction or loss of effective collective pitch control.

**7167.** The maximum weight as used in weight and balance control of a given aircraft can normally be found

- A— in the back of the aircraft logbook.
- B— by weighing the aircraft to obtain empty weight and mathematically adding the weight of fuel, oil, pilot, passengers, and baggage.
- C— in the Aircraft Specification or Type Certificate Data Sheet.
- D— by adding the empty weight and payload.

**7168.** An aircraft with an empty weight of 2,100 pounds and an empty weight CG +32.5 was altered as follows:

1. two 18-pound passenger seats located at +73 were removed;
2. structural modifications were made at +77 increasing weight by 17 pounds;
3. a seat and safety belt weighing 25 pounds were installed at +74.5; and
4. radio equipment weighing 35 pounds was installed at +95.

What is the new empty weight CG?

- A— +30.44.
- B— +34.01.
- C— +33.68.
- D— +34.65.

**7169.** The CG range in single-rotor helicopters is

- A— in a location that prevents external loads from being carried.
- B— much greater than for airplanes.
- C— approximately the same as the CG range for airplanes.
- D— more restricted than for airplanes.

**7170.** The amount of fuel used for computing empty weight and corresponding CG is

- A— empty fuel tanks.
- B— unusable fuel.
- C— full fuel tanks.
- D— the amount of fuel necessary for 1/2 hour of operation.

**7171.** An aircraft as loaded weighs 4,954 pounds at a CG of +30.5 inches. The CG range is +32.0 inches to +42.1 inches. Find the minimum weight of the ballast necessary to bring the CG within the CG range. The ballast arm is +162 inches.

- A— 61.98 pounds.
- B— 30.58 pounds.
- C— 46.24 pounds.
- D— 57.16 pounds.

**7172.** As weighed, the total empty weight of an aircraft is 5,862 pounds with a moment of 885,957. However, when the aircraft was weighed, 20 pounds of alcohol were on board at +84, and 23 pounds of hydraulic fluid were in a tank located at +101. What is the empty weight CG of the aircraft?

- A— 150.700.
- B— 151.700.
- C— 154.200.
- D— 151.365.

**7173.** Two boxes which weigh 10 pounds and 5 pounds are placed in an airplane so that their distance aft from the CG are 4 feet and 2 feet respectively. How far forward of the CG should a third box, weighing 20 pounds, be placed so that the CG will not be changed?

- A— 3 feet.
- B— 2.5 feet.
- C— 6 feet.
- D— 8 feet.

**7174.** An aircraft with an empty weight of 1,800 pounds and an empty weight CG of +31.5 was altered as follows:

1. two 15-pound passenger seats located at +72 were removed;
2. structural modifications increasing the weight 14 pounds were made at +76;
3. a seat and safety belt weighing 20 pounds were installed at +73.5; and
4. radio equipment weighing 30 pounds was installed at +30.

What is the new empty weight CG?

- A— +30.61.
- B— +35.04.
- C— +31.61.
- D— +32.69.

**7175.** An aircraft had an empty weight of 2,886 pounds with a moment of 101,673.78 before several alterations were made. The alterations included:

1. removing two passenger seats (15 pounds each) at +71;
2. installing a cabinet (97 pounds) at +71;
3. installing a seat and safety belt (20 pounds) at +71; and
4. installing radio equipment (30 pounds) at +94.

The alterations caused the new empty weight CG to move

- A— 1.62 inches forward of the original empty weight CG.
- B— 1.62 inches aft of the original empty weight CG.
- C— 2.03 inches forward of the original empty weight CG.
- D— 2.03 inches aft of the original empty weight CG.

**7176.** If a 40-pound generator applies +1400 inch-pounds to a reference axis, the generator is located

- A— -25 from the axis.
- B— -35 from the axis.
- C— +35 from the axis.
- D— +25 from the axis.

**7177.** In a balance computation of an aircraft from which an item located aft of the datum was removed, use

- A— (+)weight X (+)arm (+)moment.
- B— (-)weight X (+)arm (-)moment.
- C— (-)weight X (-)arm (+)moment.
- D— (+)weight X (-)arm (-)moment.

**7178.**

Datum is forward of the  
main gear center point . . . . . 30.24 in  
Actual distance between tail gear  
and main gear center points . . . . . 360.26 in  
Net weight at right main gear . . . . . 9,980 lb  
Net weight at left main gear . . . . . 9,770 lb  
Net weight at tail gear . . . . . 1,970 lb

These items were in the aircraft when weighed:

1. Lavatory water tank full (34 pounds at +352).
2. Hydraulic fluid (22 pounds at -8).
3. Removable ballast (146 pounds at +380).

What is the empty weight CG of the aircraft described above?

- A— 62.92 inches.
- B— 60.31 inches.
- C— 58.54 inches.
- D— 59.50 inches.

**7179.** When making a rearward weight and balance check to determine that the CG will not exceed the rearward limit during extreme conditions, the items of useful load which should be computed at their minimum weights are those located forward of the

- A— forward CG limit.
- B— empty weight CG.
- C— datum.
- D— rearward CG limit.

**7180.** When an empty aircraft is weighed, the combined net weight at the main gears is 3,540 pounds with an arm of 195.5 inches. At the nose gear, the net weight is 2,322 pounds with an arm of 83.5 inches. The datum line is forward of the nose of the aircraft. What is the empty CG of the aircraft?

- A— 151.1.
- B— 158.7.
- C— 155.2.
- D— 146.5.



**7181.** An aircraft with an empty weight of 1,500 pounds and an empty weight CG of +28.4 was altered as follows:

1. two 12-pound seats located at +68.5 were removed;
2. structural modifications weighing +28 pounds were made at +73;
3. a seat and safety belt weighing 30 pounds were installed at +70.5; and
4. radio equipment weighing 25 pounds was installed at +85.

What is the new empty weight CG?

- A— +23.51.
- B— +30.81.
- C— +31.35.
- D— +30.30.

**7182.** The following alteration was performed on an aircraft: A model B engine weighing 175 pounds was replaced by a model D engine weighing 185 pounds at a -62.00-inch station. The aircraft weight and balance records show the previous empty weight to be 998 pounds and an empty weight CG of 13.48 inches. What is the new empty weight CG?

- A— 12.99 inches.
- B— 13.96 inches.
- C— 14.25 inches.
- D— 12.73 inches.

**7183.** If the empty weight CG of an airplane lies within the empty weight CG limits,

- A— it is necessary to calculate CG extremes.
- B— it is not necessary to calculate CG extremes.
- C— a loading schedule will not be required.
- D— minimum fuel should be used in both forward and rearward CG checks.

**7184.** When computing the maximum forward loaded CG of an aircraft, minimum weights, arms, and moments should be used for items of useful load that are located aft of the

- A— rearward CG limit.
- B— forward CG limit.
- C— datum.
- D— empty weight CG.

**7185.** Find the empty weight CG location for the following tricycle-gear aircraft. Each main wheel weighs 753 pounds, nosewheel weighs 22 pounds, distance between nosewheel and main wheels is 87.5 inches, nosewheel location is +9.875 inches from datum, with 1 gallon of hydraulic fluid at -21.0 inches included in the weight scale.

- A— +97.375 inches.
- B— +94.89 inches.
- C— +95.61 inches.
- D— +96.11 inches.

**7186.** Which coupling nut should be selected for use with 1/2-inch aluminum oil lines which are to be assembled using flared tube ends and standard AN nuts, sleeves, and fittings?

- A— AN-818-2.
- B— AN-818-8.
- C— AN-818-5.
- D— AN-818-12.

**7187.** Hydraulic lines located in entryways or passenger, crew, or baggage compartments

- A— should be suitably supported and protected against physical damage.
- B— are not normally permitted.
- C— must be routed in separate enclosures which must be drained and vented to the outside atmosphere.
- D— must not contain any fittings or connections within the entryways or compartments.

**7188.** From the following sequences of steps, indicate the proper order you would use to make a single flare on a piece of tubing:

1. Place the tube in the proper size hole in the flaring block.
2. Project the end of the tube slightly from the top of the flaring tool, about the thickness of a dime.
3. Slip the fitting nut and sleeve on the tube.
4. Strike the plunger several light blows with a lightweight hammer or mallet and turn the plunger one-half turn after each blow.
5. Tighten the clamp bar securely to prevent slippage.
6. Center the plunger or flaring pin over the tube.

- A— 6, 5, 2, 1, 4, 3.
- B— 1, 3, 5, 2, 4, 6.
- C— 3, 1, 6, 2, 5, 4.
- D— 3, 2, 6, 5, 1, 4.

**7189.** Hydraulic tubing, which is damaged in a localized area to such an extent that repair is necessary, may be repaired

- A— by cutting out the damaged area and utilizing a swaged tube fitting to join the tube ends.
- B— only by replacing the entire tubing using the same size and material as the original.
- C— by cutting out the damaged section and installing a short piece of flexible hydraulic hose with hose clamps.
- D— by cutting out the damaged section and soldering in a replacement section of tubing.

**7190.** What is an advantage of a double flare on aluminum tubing?

- A— It is less concentric than a single flare.
- B— Ease of construction.
- C— It is less resistant to the shearing effect of torque.
- D— It is more resistant to the shearing effect of torque.

**7191.** A certain amount of slack must be left in a flexible hose during installation because, when under pressure, it

- A— contracts in length and diameter.
- B— expands in length and diameter.
- C— expands in length and contracts in diameter.
- D— contracts in length and expands in diameter.

**7192.** The term “cold flow” is generally associated with

- A— hydraulic lock.
- B— vaporizing fuel.
- C— rubber hose.
- D— welding and sheet metal.

**7193.** What is the color of an AN steel flared-tube fitting?

- A— Black.
- B— Blue.
- C— Red.
- D— Green.

**7194.** If failure of a flexible hydraulic hose equipped with swaged end fittings occurs, what repair procedures should be followed?

- A— Insert a nonmetallic hose liner which is approved for use with the type of fluid contained in the system and clamp firmly at both ends.
- B— Remove the hose fittings and reuse on a new flexible line of the correct length.
- C— Replace the hose with rigid tubing equipped with end fittings of the same type as those used in other parts of the system.
- D— Install a replacement hose of the proper length which has been factory equipped with swaged end fittings.

**7195.** Select the correct statement in reference to flare fittings.

- A— AN fittings can easily be identified by the shoulder between the end of the threads and the flare cone.
- B— All parts of the AN fitting assemblies are interchangeable with AC fitting assemblies with the exception of the sleeves.
- C— AC and AN fittings are identical except for the material from which they are made and the identifying color.
- D— AC fittings have generally replaced the older AN fittings.

**7196.** Flexible lines must be installed

- A— where bends are necessary.
- B— only aft of the firewall.
- C— with just enough slack to make the connection.
- D— with 5 to 8 percent slack.

**7197.** The maximum distance between end fittings to which a straight hose assembly is to be connected is 50 inches. The minimum hose length to make such a connection should be

- A— 54-1/2 inches.
- B— 50-3/4 inches.
- C— 51 inches.
- D— 52-1/2 inches.

**7198.** Soft aluminum tubing (1100, 3003, or 5052) may be bent by hand if the size is

- A— 5/16 inch or less.
- B— 7/16 inch or less.
- C— 5/8 inch or less.
- D— 1/4 inch or less.



**7199.** The material specifications for a certain aircraft require that a replacement oil line be fabricated from 3/4-inch 0.072 5052-0 aluminum alloy tubing. What is the inside dimension of this tubing?

- A— 0.606 inch.
- B— 0.572 inch.
- C— 0.688 inch.
- D— 0.750 inch.

**7200.** In most aircraft hydraulic systems, two-piece tube connectors consisting of a sleeve and a nut are used when a tubing flare is required. The use of this type connector eliminates

- A— the need for flexible lines interconnecting movable and stationary components.
- B— the flaring operation prior to assembly.
- C— the possibility of reducing the flare thickness by wiping or ironing during the tightening process.
- D— wrench damage to the tubing during the tightening process.

**7201.** Which statement about Military Standard (MS) flareless fittings is correct?

- A— MS flareless fitting sleeves must not be preset on the line prior to final assembly.
- B— During installation, MS flareless fittings are normally tightened by turning the nut a specified amount after the sleeve and fitting sealing surface have made contact, rather than being torqued.
- C— MS flareless fittings should not be lubricated prior to assembly.
- D— MS flareless fittings must be tightened to a specific torque.

**7202.** When flaring aluminum tubing for use with AN coupling nuts and sleeves, the flare angle should be

- A— 30°.
- B— 37°.
- C— 67°.
- D— 45°.

**7203.** Scratches or nicks on the straight portion of aluminum alloy tubing may be repaired if they are no deeper than

- A— 20 percent of the wall thickness.
- B— 1/32 inch.
- C— 1/16 inch.
- D— 10 percent of the wall thickness.

**7204.** What is one purpose of the lay line on flexible hose?

- A— Reflects hose twist.
- B— Width of line corresponds to hose inside diameter.
- C— Width of line corresponds to wall thickness.
- D— Indicates the minimum bend radius for the hose.

**7205.** When installing a hydraulic line, the tube flare should meet the fitting squarely and fully before starting the nut. The flare should never be drawn to the fitting with the nut because this may

- A— deform the line.
- B— strip the threads on the fitting.
- C— deform the flare.
- D— strip the threads on the nut.

**7206.** Flexible hose used in aircraft plumbing is classified in size according to the

- A— outside diameter.
- B— cross-sectional area.
- C— wall thickness.
- D— inside diameter.

**7207.** A scratch or nick in aluminum alloy tubing can be repaired by burnishing provided the scratch or nick does not

- A— exceed 5 percent of the tube diameter.
- B— appear in the heel of a bend in the tube.
- C— exceed 20 percent of the wall thickness of the tube.
- D— exceed 10 percent of the tube diameter.

**7208.** A hose material that can be used to carry a wide range of petroleum and synthetic fluids is

- A— Butyl.
- B— Teflon.
- C— Buna-N.
- D— neoprene.

**7209.** Which tubings have the characteristics (high strength, abrasion resistance) necessary for use in a high-pressure (3,000 PSI) hydraulic system for operation of landing gear and flaps?

- A— Copper or hard plastic.
- B— 2024-T or 5052-0 aluminum alloy.
- C— Corrosion-resistant steel annealed or 1/4H.
- D— 1100-1/2H or 3003-1/2H aluminum alloy.

**7210.** When installing bonded clamps to support metal tubing,

- A— paint removal from tube is unnecessary as it will inhibit corrosion.
- B— paint clamp and tube after clamp installation for slippage identification.
- C— paint clamp and tube after clamp installation to prevent corrosion.
- D— remove paint or anodizing from tube at clamp location.

**7211.** In a metal tubing installation,

- A— rigid straight line runs are preferable.
- B— tension is undesirable because pressurization will cause it to expand and shift.
- C— a tube may be pulled in line if nut will start on threaded coupling.
- D— tension is desirable because it cannot shift when pressurized.

**7212.** A fluid line marked with the letters PHDAN

- A— carries hydraulic fluid back to the reservoir.
- B— is a high-pressure fluid line. The letters mean Pressure High, Discharge at Nacelle.
- C— is carrying a fluid which may be dangerous to personnel.
- D— must be made of a nonphosphorous metal.

**7213.** Which statement concerning Bernoulli's principle is true?

- A— The pressure of a fluid increases at points where the velocity of the fluid increases.
- B— The pressure of a fluid decreases at points where the velocity of the fluid increases.
- C— It has no practical application in today's aircraft.
- D— It applies only to gases.

**7214.** (1) Bonded clamps are used for support when installing metal tubing.

(2) Unbonded clamps are used for support when installing wiring.

Regarding the above statements,

- A— only No. 2 is true.
- B— only No. 1 is true.
- C— both No. 1 and No. 2 are true.
- D— neither No. 1 nor No. 2 is true.

**7215.** Flexible hose may be used in aircraft fluid systems

- A— to replace only low-pressure fluid system lines.
- B— to replace any fluid system line not subject to heat.
- C— according to the manufacturer's specifications.
- D— to replace any fluid system line.

**7216.** Which nondestructive inspection method is most suitable for inspecting wing internal structures?

- A— Continuous magnetic particle inspection.
- B— Penetrant inspection.
- C— Radiographic inspection.
- D— Residual magnetic particle inspection.

**7217.** Magnetic particle inspection is used primarily to detect

- A— distortion.
- B— irregular surfaces.
- C— deep subsurface flaws.
- D— flaws on or near the surface.

**7218.** In order for dye penetrant inspection to be effective, the material being checked must

- A— have subsurface cracks.
- B— be magnetic.
- C— be nonmagnetic.
- D— have surface cracks.

**7219.** Which of these nondestructive testing methods is suitable for the inspection of most metals, plastics, and ceramics for surface and subsurface defects?

- A— Eddy current inspection.
- B— Magnetic particle inspection.
- C— Fluorescent penetrant inspection.
- D— Ultrasonic inspection.



**7220.** What nondestructive testing method requires little or no part preparation, is used to detect surface or near-surface defects in most metals, and may also be used to separate metals or alloys and their heat-treat conditions?

- A— Eddy current inspection.
- B— Ultrasonic inspection.
- C— X-ray or radiographic inspection.
- D— Magnetic particle inspection.

**7221.** What is the principal advantage of the radiographic inspection method of nondestructive testing?

- A— Minimum safety precautions required.
- B— Little or no disassembly of structure.
- C— Simplicity of equipment operation.
- D— Low cost.

**7222.** What method of magnetic particle inspection is used most often to inspect aircraft parts for invisible cracks and other defects?

- A— Residual.
- B— Inductance.
- C— Continuous.
- D— Intermittent.

**7223.** How many of these factors are considered essential knowledge for x-ray exposure?

1. Processing of the film.
2. Material thickness and density.
3. Exposure distance and angle.
4. Film characteristics.

- A— One.
- B— Two.
- C— Three.
- D— Four.

**7224.** The testing medium that is generally used in magnetic particle inspection utilizes a ferromagnetic material that has

- A— low permeability and low retentivity.
- B— high permeability and low retentivity.
- C— low permeability and high retentivity.
- D— high permeability and high retentivity.

**7225.** Which statement relating to the residual magnetizing inspection method is true?

- A— It requires careful and intelligent interpretation and evaluation of the discontinuities it reveals.
- B— It is used in practically all circular and longitudinal magnetizing procedures.
- C— It may be used only with steels which have been heat treated for stressed applications.
- D— Its indicating medium is applied when the magnetizing force is being maintained.

**7226.** A mechanic has completed a bonded honeycomb repair using the potted compound repair technique. What nondestructive testing method is used to determine the soundness of the repair after the repair has cured?

- A— Dye penetrant test.
- B— Eddy current test.
- C— Metallic ring test.
- D— Ultrasonic test.

**7227.** What two types of indicating mediums are available for magnetic particle inspection?

- A— Iron and ferric oxides.
- B— Wet and dry process materials.
- C— Penetrant and fluorescent material.
- D— High retentivity and low permeability material.

**7228.** Which of these metals is inspected using the magnetic particle inspection method?

- A— Magnesium alloys.
- B— Aluminum alloys.
- C— Iron alloys.
- D— Copper.

**7229.** One way a part may be demagnetized after magnetic particle inspection is by

- A— subjecting the part to a steady, low current flow of dc.
- B— subjecting the part to a short, high current burst of ac.
- C— slowly moving the part out of an ac magnetic field of sufficient strength.
- D— slowly moving the part into an ac magnetic field of sufficient strength.



**7230.** Which type crack can be detected by magnetic particle inspection using either circular or longitudinal magnetization?

- A— 45°.
- B— Longitudinal.
- C— Transverse.
- D— Circumferential.

**7231.** Surface cracks in aluminum castings and forgings may usually be detected by

- A— the use of dye penetrants and suitable developers.
- B— heating the part to approximately 750° and observing the surface for any material that may have been forced out of a crack.
- C— magnetic particle inspection.
- D— submerging the part in a solution of hydrochloric acid and rinsing with clear water.

**7232.** To detect a minute crack using dye penetrant inspection requires

- A— that the developer be applied to a wet surface.
- B— a shorter-than-normal penetrating time.
- C— a longer-than-normal penetrating time.
- D— the surface to be highly polished.

**7233.** When checking an item with the magnetic particle inspection method, circular and longitudinal magnetization should be used to

- A— reveal all possible defects.
- B— prevent permanent magnetization.
- C— prevent one-way polarization.
- D— ensure uniform current flow.

**7234.** What is the primary limitation of the dye penetrant method of inspection?

- A— The defect must be open to the surface.
- B— The smaller the defect, the longer the penetrating time required.
- C— The washing or rinsing operation causes unreliable results.
- D— It is limited in use to a small number of metals.

**7235.** Dye penetrant inspection method will detect

- A— surface defects.
- B— subsurface flaws.
- C— deteriorated molded rubber.
- D— cracks in any porous material.

**7236.** If dye penetrant inspection indications are not sharp and clear, the most probable cause is that the part

- A— was not correctly degaussed before the developer was applied.
- B— is not damaged.
- C— is badly damaged over an extensive area of its surface.
- D— was not thoroughly washed before developer was applied.

**7237.** (1) An aircraft part may be demagnetized by subjecting it to a magnetizing force from alternating current that is gradually reduced in strength.

(2) An aircraft part may be demagnetized by subjecting it to a magnetizing force from direct current that is alternately reversed in direction and gradually reduced in strength.

Regarding the above statements,

- A— both No. 1 and No. 2 are true.
- B— neither No. 1 nor No. 2 is true.
- C— only No. 1 is true.
- D— only No. 2 is true.

**7238.** If a pure metal is heated above its critical temperature and cooled to room temperature, it will

- A— form a mechanical mixture.
- B— return to its original structure.
- C— form a combination of a solid solution and mechanical mixture.
- D— form a complex solution.

**7239.** The pattern for an inclusion is a magnetic particle buildup forming

- A— a fernlike pattern.
- B— a single line.
- C— a smooth outline.
- D— parallel lines.

**7240.** A part which is being prepared for dye penetrant inspection should be cleaned

- A— by sandblasting.
- B— with a volatile petroleum-base solvent.
- C— with the penetrant developer.
- D— with water-base solvents only.

**7241.** Which type crack will probably cause the most buildup in the magnetic particle indicating medium?

- A— Heat-treated.
- B— Shrink.
- C— Fatigue.
- D— Grinding.

**7242.** Under magnetic particle inspection, a part will be identified as having a fatigue crack under which condition?

- A— The discontinuity pattern is straight.
- B— The discontinuity is found in a nonstressed area of the part.
- C— The discontinuity is found in a highly stressed area of the part.
- D— The discontinuity pattern is not clear.

**7243.** The main disadvantage of dye penetrant inspection is that

- A— the chemicals used are dangerous to the inspection personnel.
- B— the defect must be open to the surface.
- C— it does not work on nonferrous metals.
- D— it is excessively time consuming.

**7244.** What defects will be detected by magnetizing a part using continuous longitudinal magnetization with a cable?

- A— Defects perpendicular to the long axis of the part.
- B— Defects parallel to the long axis of the part.
- C— Defects perpendicular to the concentric circles of magnetic force within the part.
- D— Defects parallel to the concentric circles of magnetic force within the part.

**7245.** Circular magnetization of a part can be used to detect which defects?

- A— Defects parallel to the long axis of the part.
- B— Defects perpendicular to the long axis of the part.
- C— Defects perpendicular to the concentric circles of magnetic force within the part.
- D— Defects parallel to the concentric circles of magnetic force within the part.

**7246.** (1) In nondestructive testing, a discontinuity may be defined as an interruption in the normal physical structure or configuration of a part.

(2) A discontinuity may or may not affect the usefulness of a part.

Regarding the above statements,

- A— only No. 1 is true.
- B— only No. 2 is true.
- C— both No. 1 and No. 2 are true.
- D— neither No. 1 nor No. 2 is true.

**7247.** What type of corrosion attacks grain boundaries of aluminum alloys which are improperly or inadequately heat treated?

- A— Stress.
- B— Intergranular.
- C— Surface.
- D— Fretting.

**7248.** If too much time is allowed to elapse during the transfer of 2017 or 2024 aluminum alloy from the heat-treatment medium to the quench tank, it may result in

- A— case hardening.
- B— a dull, stained, or streaked surface.
- C— retarded age hardening.
- D— impaired corrosion resistance.

**7249.** Which heat-treating process of metal produces a hard, wear-resistant surface over a strong, tough core?

- A— Case hardening.
- B— Annealing.
- C— Tempering.
- D— Normalizing.

**7250.** Which heat-treating operation would be performed when the surface of the metal is changed chemically by introducing a high carbide or nitride content?

- A— Tempering.
- B— Normalizing.
- C— Case hardening.
- D— Annealing.



**7251.** Transfer of 2024 aluminum alloy from the heat-treat medium to the quench tank must be done quickly to

- A— prevent stress cracking.
- B— retard the age-hardening process.
- C— attain good corrosion-resistant qualities.
- D— ensure a good bond between core and aluminum coating.

**7252.** Nitriding is a process which

- A— forms a hard case on a part to resist wear.
- B— decreases the size of the grain structure.
- C— toughens steel to increase its tensile strength.
- D— increases bearing heat resistance.

**7253.** What does NOT take place during the aging process of an aluminum alloy after solution heat treatment?

- A— The material becomes stronger.
- B— The material becomes harder.
- C— The material becomes more difficult to bend and form.
- D— The material becomes more resistant to corrosion.

**7254.** In order to successfully heat treat ferrous metals, the rate of cooling is controlled by

- A— allowing a time lag between soaking and quenching.
- B— selecting a suitable quenching media.
- C— artificial aging.
- D— re-precipitation.

**7255.** Why is steel tempered after being hardened?

- A— To increase its hardness and ductility.
- B— To decrease its ductility and brittleness.
- C— To increase its strength and decrease its internal stresses.
- D— To relieve its internal stresses and reduce its brittleness.

**7256.** What aluminum alloy designations indicate that the metal has been solution heat treated and artificially aged?

- A— 3003-F.
- B— 7075-T6.
- C— 5052-H36.
- D— 6061-O.

**7257.** If alloy 2024 rivets are not driven within approximately 10 minutes after they have been quenched, they must be

- A— aged.
- B— normalized.
- C— reheat treated.
- D— reheated and driven hot.

**7258.** Which type of steel is best suited for case hardening?

- A— Low-carbon, low-alloy.
- B— High-carbon, low-alloy.
- C— Low-carbon, high-alloy.
- D— High-carbon, high-alloy.

**7259.** Which material cannot be heat treated repeatedly without harmful effects?

- A— Unclad aluminum alloy in sheet form.
- B— Products which are molded of steel.
- C— 6061-T9 stainless steel.
- D— Clad aluminum alloy.

**7260.** What is descriptive of the annealing process of steel during and after it has been annealed?

- A— Furnace cooling; coarse grain.
- B— Rapid cooling; high strength.
- C— Slow cooling; low strength.
- D— Slow cooling; increased resistance to wear.

**7261.** What will determine the hardness of steel at ordinary temperatures?

- A— The number of particles of iron carbide in the mixture.
- B— The size of the particles of iron austenite in the mixture.
- C— The distribution of the particles of iron matrix throughout the mixture.
- D— The transformation of pearlite to austenite in the mixture.

**7262.** Unless otherwise specified, torque values for tightening aircraft nuts and bolts relate to

- A— dry, thoroughly degreased threads.
- B— lightly oiled threads.
- C— well oiled threads.
- D— threads lubricated with a dry lubricant.



**7263.** What is generally used in the construction of aircraft engine firewalls?

- A— Aluminum alloy sheet.
- B— Stainless steel.
- C— Chrome-molybdenum alloy steel.
- D— Magnesium-titanium alloy steel.

**7264.** Unless otherwise specified or required, aircraft bolts should be installed so that the bolthead is

- A— upward, or in a rearward direction.
- B— upward, or in a forward direction.
- C— downward, or in a forward direction.
- D— downward, or in a rearward direction.

**7265.** Alclad is a metal consisting of

- A— aluminum alloy surface layers and a pure aluminum core.
- B— pure aluminum surface layers on an aluminum alloy core.
- C— a homogeneous mixture of pure aluminum and aluminum alloy.
- D— alternating layers of pure aluminum and aluminum alloy.

**7266.** A fiber-type, self-locking nut must never be used on an aircraft if the bolt is

- A— under shear loading.
- B— under tension loading.
- C— subject to rotation.
- D— to be mounted in a vertical position.

**7267.** The Society of Automotive Engineers and the American Iron and Steel Institute use a numerical index system to identify the composition of various steels. The symbol 1020 indicates a plain carbon steel containing an average of

- A— 20.00 percent carbon.
- B— 2.00 percent carbon by volume.
- C— 2.00 percent carbon by weight.
- D— 0.20 percent carbon by weight.

**7268.** (Refer to figure 35.) Which of the bolthead code markings shown identifies a corrosion resistant AN standard steel bolt?

- A— 1.
- B— 2.
- C— 3.
- D— 4.

**7269.** Aircraft bolts with a cross or asterisk marked on the bolthead are

- A— made of stainless steel.
- B— made of aluminum alloy.
- C— close tolerance bolts.
- D— standard steel bolts.

**7270.** Which statement regarding aircraft bolts is correct?

- A— AN standard steel bolts are marked with two raised dashes on the bolthead.
- B— When tightening castellated nuts on drilled bolts, if the cotter pin holes do not line up, it is permissible to overtighten the nut to permit alignment of the next slot with the cotter pin hole.
- C— In general, bolt grip lengths should equal the material thickness.
- D— Alloy steel bolts smaller than 1/4-inch diameter should not be used in primary structure.

**7271.** Generally speaking, bolt grip lengths should be

- A— one and one-half times the thickness of the material through which they extend.
- B— equal to the thickness of the material through which they extend plus approximately one diameter.
- C— equal to the thickness of the material through which they extend.
- D— at least three times the thickness of the thinnest sheet.

**7272.** When the specific torque value for nuts is not given, where can the recommended torque value be found?

- A— AC 43.13-2A.
- B— FAR Part 43, appendix D.
- C— Technical Standard Order.
- D— AC 43.13-1A.

**7273.** (Refer to figure 36.) Identify the clevis bolt illustrated.

- A— 1.
- B— 2.
- C— 4.
- D— 3.

**7274.** A particular component is attached to the aircraft structure by the use of an aircraft bolt and a castellated tension nut combination. If the cotter pin hole does not align within the recommended torque range, the acceptable practice is to

- A— exceed the torque range.
- B— lubricate the threaded sections of the nut and bolt and retorque.
- C— change washers and try again.
- D— use a lockwasher instead of a cotter pin.

**7275.** A bolt with a single raised dash on the head is classified as an

- A— AN corrosion-resistant steel bolt.
- B— NAS standard aircraft bolt.
- C— NAS close tolerance bolt.
- D— AN aluminum alloy bolt.

**7276.** How is a clevis bolt used with a fork-end cable terminal secured?

- A— With a self-locking nut with a lockwasher to prevent rotation of the bolt in the fork.
- B— With a shear nut tightened to a snug fit, but with no strain imposed on the fork and safetied with a cotter pin.
- C— With a castle nut tightened until slight binding occurs between the fork and the fitting to which it is being attached.
- D— With a shear nut and cotter pin or a thin self-locking nut tightened enough to prevent rotation of the bolt in the fork.

**7277.** Where is an AN clevis bolt used in an airplane?

- A— In landing gear assemblies.
- B— For tension and shear load conditions.
- C— Where external tension loads are applied.
- D— Only for shear load applications.

**7278.** A bolt with an X inside a triangle on the head is classified as an

- A— AN aluminum alloy bolt.
- B— NAS standard aircraft bolt.
- C— NAS close tolerance bolt.
- D— AN corrosion-resistant steel bolt.

**7279.** The core material of Alclad 2024-T4 is

- A— commercially pure aluminum, and the surface material is strain-hardened aluminum alloy.
- B— heat-treated aluminum alloy, and the surface material is commercially pure aluminum.
- C— commercially pure aluminum, and the surface material is heat-treated aluminum alloy.
- D— strain-hardened aluminum alloy, and the surface material is commercially pure aluminum.

**7280.** The aluminum code number 1100 identifies what type of aluminum?

- A— Aluminum alloy containing 11 percent copper.
- B— Heat-treated aluminum alloy.
- C— Aluminum alloy containing zinc.
- D— 99 percent commercially pure aluminum.

**7281.** Aircraft bolts are usually manufactured with a

- A— class 1 fit for the threads.
- B— class 2 fit for the threads.
- C— class 3 fit for the threads.
- D— class 4 fit for the threads.

**7282.** In the four-digit aluminum index system number 2024, the first digit indicates

- A— zinc has been added to the aluminum.
- B— the percent of alloy added.
- C— the different alloys in that group.
- D— copper is the major alloying element.

**7283.** How is the locking feature of the fiber-type locknut obtained?

- A— By a saw-cut fiber insert with a pinched-in thread in the locking section.
- B— By the use of an unthreaded fiber locking insert.
- C— By a fiber insert held firmly in place at the base of the load carrying section.
- D— By placing the threads in the fiber insert out-of-phase with the load carrying section.

**7284.** (Refer to figure 37.) Identify the weld caused by an excessive amount of acetylene.

- A— 4.
- B— 1.
- C— 3.
- D— 2.



**7285.** (Refer to figure 37.) Select the illustration which depicts a cold weld.

- A— 3.
- B— 1.
- C— 2.
- D— 4.

**7286.** Why is it considered good practice to normalize a part after welding?

- A— To relieve internal stresses developed within the base metal.
- B— To burn out any excess carbon deposited during welding.
- C— To introduce a slight amount of carbon to improve the surface hardness of the weld.
- D— To remove the surface scale formed during welding.

**7287.** Holes and a few projecting globules are found in a weld. What action should be taken?

- A— Fill the holes with solder.
- B— Reheat the bead to melt the globules.
- C— Remove all the old weld and reweld the joint.
- D— File the rough surface.

**7288.** Which condition indicates a part has cooled too quickly after being welded?

- A— An excessive amount of puddling.
- B— Cracking adjacent to the weld.
- C— Discoloration of the base metal.
- D— Gas pockets, porosity, and slag inclusions.

**7289.** Select a characteristic of a good gas weld.

- A— The depth of penetration shall be sufficient to ensure fusion of the filler rod.
- B— The weld should be built up 1/8 inch.
- C— The weld should taper off smoothly into the base metal.
- D— No oxide should be formed on the base metal.

**7290.** One characteristic of a good weld is that no oxide should be formed on the base metal at a distance from the weld of more than

- A— 1/2 inch.
- B— 1 inch.
- C— 1/8 inch.
- D— 1/4 inch.

**7291.** (Refer to figure 38.) What type weld is shown at A?

- A— Fillet.
- B— Butt.
- C— Lap.
- D— Edge.

**7292.** (Refer to figure 38.) What type weld is shown at B?

- A— Fillet.
- B— Double butt.
- C— Flat.
- D— Edge.

**7293.** (Refer to figure 38.) What type weld is shown at G?

- A— Lap.
- B— Butt.
- C— Flat.
- D— Edge.

**7294.** On a fillet weld, the penetration requirements are what percentage(s) of the base metal thickness?

- A— 100 percent.
- B— 25 to 50 percent.
- C— 60 to 80 percent.
- D— 85 to 95 percent.

**7295.** Which tool can be used to measure the alignment of a rotor shaft or the plane of rotation of a disk?

- A— Depth gauge.
- B— Dial indicator.
- C— Shaft gauge.
- D— Protractor.

**7296.** (Refer to figure 39.) The measurement reading on the illustrated micrometer is

- A— 0.2915.
- B— 0.2861.
- C— 0.2911.
- D— 0.2901.



**7297.** Identify the correct statement.

- A— An outside micrometer is limited to measuring diameters.
- B— Tools used on certificated aircraft must be an approved type.
- C— Dividers do not provide a reading when used as a measuring device.
- D— A propeller protractor will provide a reading in degrees or inches.

**7298.** (Refer to figure 40.) What is the measurement reading on the vernier caliper scale?

- A— 1.411 inches.
- B— 1.436 inches.
- C— 1.461 inches.
- D— 1.700 inches.

**7299.** Which tool is used to measure the clearance between a surface plate and a surface being checked for flatness?

- A— Depth gauge.
- B— Surface gauge.
- C— Thickness gauge.
- D— Dial indicator.

**7300.** Which number represents the vernier scale graduation of a micrometer?

- A— .00001.
- B— .001.
- C— .0001.
- D— .01.

**7301.** Which tool is used to find the center of a shaft or other cylindrical work?

- A— Combination set.
- B— Surface gauge.
- C— Dial indicator.
- D— Micrometer caliper.

**7302.** (Refer to figure 41.) What does the micrometer read?

- A— .2974.
- B— .2918.
- C— .3004.
- D— .3108.

**7303.** If it is necessary to accurately measure the diameter of a hole approximately 1/4 inch in diameter, the mechanic should use a

- A— telescoping gauge and read the measurement directly from the gauge.
- B— telescoping gauge and determine the size of the hole by taking a micrometer reading of the adjustable end of the telescoping gauge.
- C— 0- to 1-inch inside micrometer and read the measurement directly from the micrometer.
- D— small-hole gauge and determine the size of the hole by taking a micrometer reading of the ball end of the gauge.

**7304.** (Refer to figure 42.) The measurement reading on the micrometer is

- A— .2758.
- B— .2702.
- C— .2792.
- D— .2785.

**7305.** What tool is generally used to set a divider to an exact dimension?

- A— Machinist scale.
- B— Surface gauge.
- C— Thickness gauge.
- D— Dial indicator.

**7306.** What tool is generally used to calibrate a micrometer or check its accuracy?

- A— Gauge block.
- B— Dial indicator.
- C— Surface gauge.
- D— Machinist scale.

**7307.** What precision measuring tool is used for measuring crankpin and main bearing journals for out-of-round wear?

- A— Dial gauge.
- B— V-blocks.
- C— Micrometer caliper.
- D— Depth gauge.

**7308.** The side clearance of piston rings is measured with a

- A— depth gauge.
- B— thickness gauge.
- C— hole gauge.
- D— telescopic gauge.

**7309.** Crankshaft alignment runout can be checked by rotating the shaft on V-blocks and a surface plate. The measurements are taken with a

- A— height gauge.
- B— dial gauge.
- C— depth gauge.
- D— telescopic gauge.

**7310.** How can the dimensional inspection of a bearing in a rocker arm be accomplished?

- A— Depth gauge and micrometer.
- B— Thickness gauge and V-blocks.
- C— Thickness gauge and push-fit arbor.
- D— Telescopic gauge and micrometer.

**7311.** The twist of a connecting rod is checked by installing push-fit arbors in both ends, supported by parallel steel bars on a surface plate. Measurements are taken between the arbor and the parallel bar with a

- A— dial gauge.
- B— height gauge.
- C— thickness gauge.
- D— depth gauge.

**7312.** The clearance between the piston rings and the ring lands is measured with a

- A— micrometer caliper.
- B— thickness gauge.
- C— dial gauge.
- D— depth gauge.

**7313.** What may be used to check the stem on a poppet-type valve for stretch?

- A— Dial indicator.
- B— Micrometer.
- C— Protractor.
- D— Telescoping gauge.

**7314.** Which tool can be used to determine piston pin out-of-round wear?

- A— Telescopic gauge.
- B— Micrometer caliper.
- C— Dividers.
- D— Dial indicator.

**7315.** During starting of a turbojet powerplant using a compressed air starter, a hung start occurred. Select the proper procedure.

- A— Advance the power lever.
- B— Increase air power to the starter.
- C— Re-engage the starter.
- D— Shut the engine down.

**7316.** A hung start in a turbojet engine is often caused by

- A— malfunctions in the ignition system.
- B— the starter cutting off too soon.
- C— no electrical power.
- D— an excessively rich fuel/air mixture.

**7317.** When towing an aircraft,

- A— discharge all hydraulic pressure to prevent accidental operation of the landing gear retracting mechanism.
- B— all tailwheel aircraft must be towed backwards.
- C— if the aircraft has a steerable nosewheel, the locking scissors should be set to full swivel.
- D— all nosewheel aircraft must be towed backwards.

**7318.** When starting an aircraft engine equipped with a float-type carburetor, the carburetor air heat control should be placed in

- A— the COLD position.
- B— the COLD position under nonicing conditions and in the HOT position under icing conditions.
- C— the HOT position to reduce the engine warmup period.
- D— a position between HOT and COLD.

**7319.** When approaching the front of an idling turbojet engine, the hazard area extends forward of the engine approximately

- A— 35 feet.
- B— 5 feet.
- C— 15 feet.
- D— 25 feet.



**7320.** The most satisfactory extinguishing agent for use in case of carburetor or intake fire is

- A— dry chemical.
- B— carbon tetrachloride.
- C— carbon dioxide.
- D— fine water spray.

**7321.** (Refer to figure 43.) Identify the signal to engage rotor on a rotorcraft.

- A— 1.
- B— 2.
- C— 4.
- D— 3.

**7322.** Overpriming of an engine may cause

- A— high oil viscosity.
- B— gummy deposits in the oil sump.
- C— lead wash of the rod bearings.
- D— oil to be washed from the cylinder walls and pistons.

**7323.** If a radial engine has been shut down for more than 30 minutes, the propeller should be rotated through several revolutions to

- A— check for hydraulic lock.
- B— prime the fuel pump.
- C— pre-oil the engine.
- D— prime the engine.

**7324.** The priming of a fuel injected horizontally opposed engine is accomplished by placing the fuel control lever in the

- A— AUTO-LEAN position.
- B— IDLE-CUTOFF position.
- C— AUTO-RICH position.
- D— FULL-RICH position.

**7325.** Which action is required if the turbine inlet temperature exceeds the specified maximum during the starting sequence of a turboprop engine?

- A— Turn off the fuel and ignition switch, discontinue the start, and make an investigation.
- B— Advance the power lever and observe for excessive smoke; if present, discontinue the start.
- C— Continue the start since temperature will stabilize as soon as 5,000 RPM is reached.
- D— Turn off the fuel and ignition switch, discontinue the start, then wait 5 minutes and initiate the starting sequence.

**7326.** How is a flooded engine, equipped with a float-type carburetor, cleared of excessive fuel?

- A— Crank the engine with the starter or by hand, with the mixture control in cutoff, ignition switch off, and the throttle fully open, until the fuel charge has been cleared.
- B— Crank the engine with the starter or by hand, with the mixture control in cutoff, ignition switch off, and the throttle closed, until the fuel has been cleared.
- C— Turn off the fuel and the ignition. Discontinue the starting attempt until the excess fuel has cleared.
- D— Crank the engine with the starter or by hand, with the mixture control in cutoff, ignition switch on, and the throttle fully open, until the excess fuel has cleared or until the engine starts.

**7327.** If fuel flows steadily from the internal supercharger drain valve during an attempt to start an engine, what is a possible cause of the trouble?

- A— Excessive booster pump pressure.
- B— The fuel pump relief valve is out of adjustment.
- C— An improper setting of the mixture control.
- D— A fatigued carburetor fuel supply line.

**7328.** (Refer to figure 44.) Which of the hand signals would you give if a taxiing aircraft were in danger of striking some object?

- A— 3.
- B— 1.
- C— 2.
- D— 4.

**7329.** Induction fires during starting can be extinguished by

- A— directing carbon dioxide into the air intake of the engine.
- B— directing carbon dioxide into the exhaust system.
- C— closing the fuel shutoff valve.
- D— closing the throttle.



**7330.** What indicator should be checked immediately after starting a reciprocating engine?

- A— Oil pressure.
- B— Manifold pressure.
- C— Tachometer.
- D— Cylinder head temperature.

**7331.** During the starting sequence of a turboprop engine, there is no oil pressure indication at 5,000 RPM for either the reduction gear or the power unit. What action is required?

- A— Turn off the ignition switch and fuel, discontinue the start, and replace the oil pressure gauge.
- B— Turn off the ignition switch and fuel, let the engine motorize for 5 minutes, and restart.
- C— Turn off the ignition switch and fuel, discontinue the start, and make an investigation.
- D— Turn off the ignition switch and fuel, discontinue the start, wait for 5 minutes, and initiate the starting sequence.

**7332.** When starting an engine equipped with a float-type carburetor with an idle cutoff unit, the mechanic should place the mixture control in the

- A— IDLE-CUTOFF position.
- B— FULL-LEAN position.
- C— FULL-RICH position while priming the engine; however, the mixture control should be returned to the IDLE-CUTOFF position when actually starting the engine.
- D— FULL-RICH position.

**7333.** When approaching the rear of an idling turbojet engine, the hazard area extends aft of the engine approximately

- A— 200 feet.
- B— 100 feet.
- C— 25 feet.
- D— 50 feet.

**7334.** During starting of a turbojet powerplant using a compressed air starter, a hot start occurrence was recorded. Select what happened from the following.

- A— The pneumatic starting unit overheated.
- B— The pneumatic starter overheated.
- C— The powerplant was preheated before starting.
- D— The fuel/air mixture was excessively rich.

**7335.** What effect will aviation gasoline mixed with jet fuel have on turbine powerplant efficiency?

- A— No appreciable effect.
- B— The tetraethyl lead in the gasoline forms deposits on the turbine blades.
- C— The tetraethyl lead in the gasoline forms deposits on the compressor blades.
- D— Continuous use will not affect engine efficiency.

**7336.** What is the action to take if aviation gasoline in an aircraft is contaminated with jet fuel?

- A— Determine the type jet fuel, then contact the engine manufacturer for guidance.
- B— Adjust mixture to compensate for lower octane.
- C— Determine the amount of fuel put in tanks and if under 25 percent of total volume, do nothing. If over 25 percent, drain the tanks and refill.
- D— Drain fuel tanks and fill with proper octane rated fuel.

**7337.** (1) Jet fuel is of higher viscosity than aviation gasoline and therefore holds contaminants better.

(2) Viscosity has no relation to contamination of fuel.

Regarding the above statements,

- A— only No. 1 is true.
- B— only No. 2 is true.
- C— both No. 1 and No. 2 are true.
- D— neither No. 1 nor No. 2 is true.

**7338.** Identify the color of low-lead 100LL aviation gasoline.

- A— Blue.
- B— Green.
- C— Orange.
- D— Purple.

**7339.** How are aviation fuels, which possess greater antiknock qualities than 100 octane, classified?

- A— As antidetonants.
- B— According to the milliliters of lead.
- C— By reference to normal heptane.
- D— By performance numbers.

**7340.** Why is ethylene dibromide added to all grades of aviation gasoline?

- A— To prevent detonation at takeoff power settings.
- B— To remove zinc silicate deposits from the spark plugs.
- C— To scavenge lead oxide from the cylinder combustion chambers.
- D— To increase the antiknock rating of the fuel.

**7341.** Both gasoline and kerosene have certain advantages for use as turbine fuel. Which statement is true in reference to the advantages of each?

- A— Kerosene has a higher heat energy per unit weight than gasoline.
- B— Gasoline is a better lubricant than kerosene (important in regard to fuel metering pumps).
- C— Gasoline has a higher heat energy per unit volume than kerosene.
- D— Kerosene has a higher heat energy per unit volume than gasoline.

**7342.** What must accompany fuel vaporization?

- A— An absorption of heat.
- B— Rearrangement of molecular structure.
- C— A reduction in volume.
- D— Rapid oxidation.

**7343.** Characteristics of detonation are

- A— rapid rise in cylinder pressure, excessive cylinder head temperature, and an increase in engine power.
- B— cylinder pressure remains the same, excessive cylinder head temperature, and a decrease in engine power.
- C— rapid rise in cylinder pressure, excessive cylinder head temperature, and a decrease in engine power.
- D— rapid rise in cylinder pressure, cylinder head temperature normal, and a decrease in engine power.

**7344.** A fuel that vaporizes too readily may cause

- A— hard starting.
- B— detonation.
- C— slow warmup.
- D— vapor lock.

**7345.** Jet fuel number identifiers are

- A— performance numbers to designate the volatility of the fuel.
- B— performance numbers and are relative to the fuel's performance in the aircraft engine.
- C— type numbers and have no relation to the fuel's performance in the aircraft engine.
- D— type numbers used to designate the vaporization rate at atmospheric pressure.

**7346.** The main differences between grades 100 and 100LL aviation gasoline are

- A— volatility and color.
- B— volatility and lead content.
- C— volatility, lead content, and color.
- D— lead content and color.

**7347.** Characteristics of aviation gasoline are

- A— high heat value, high volatility.
- B— high heat value, low volatility.
- C— low heat value, high volatility.
- D— low heat value, low volatility.

**7348.** Tetraethyl lead is added to gasoline to

- A— retard the formation of corrosives.
- B— lubricate the valve seats.
- C— improve the gasoline's performance in the engine.
- D— dissolve the moisture in the gasoline.

**7349.** A fuel that does not vaporize readily enough can cause

- A— vapor lock.
- B— detonation.
- C— hard starting.
- D— surface ignition.

**7350.** What material is used to clean magnesium engine parts prior to painting?

- A— Dichromate solution.
- B— Acetone.
- C— MEK (methyl ethyl ketone).
- D— 20 percent caustic soda solution.



**7351.** How may magnesium engine parts be cleaned?

- A— Soak in a 20 percent caustic soda solution.
- B— Wash with gasoline.
- C— Spray with MEK (methyl ethyl ketone).
- D— Wash with a commercial solvent, decarbonize, and scrape or grit blast.

**7352.** Which solvent is recommended for removing grease from fabric prior to doping?

- A— Kerosene.
- B— Acetone.
- C— Toluene.
- D— Turpentine.

**7353.** When an anodized surface coating is damaged in service, it can be partially restored by

- A— use of a metal polish.
- B— chemical surface treatment.
- C— complete penetration of an inhibitor.
- D— a suitable mild cleaner.

**7354.** Select the solvent recommended for wipedown of cleaned surfaces just before painting.

- A— Aliphatic naphtha.
- B— Trichloroethane.
- C— Dry-cleaning solvent.
- D— Kerosene.

**7355.** Nickel-cadmium battery cases and drain surfaces which have been affected by electrolyte should be neutralized with a solution of

- A— boric acid.
- B— diluted sulphuric acid.
- C— sodium bicarbonate.
- D— potassium hydroxide.

**7356.** What is used for general cleaning of aluminum surfaces by mechanical means?

- A— Carborundum paper.
- B— Aluminum wool.
- C— Crocus cloth.
- D— Steel wool.

**7357.** Select the solvent used to clean acrylics and rubber.

- A— Aliphatic naphtha.
- B— Methyl ethyl ketone.
- C— Aromatic naphtha.
- D— Methyl chloroform.

**7358.** Fayed surfaces cause concern in chemical cleaning because of the danger of

- A— electrostatic charge buildup.
- B— electrochemical attack.
- C— entrapping corrosive materials.
- D— corrosion by imbedded iron oxide.

**7359.** What effect does a caustic cleaning product have on aluminum structures?

- A— Electrochemical.
- B— Mechanical.
- C— Strengthening.
- D— Corrosive.

**7360.** Fretting corrosion is most likely to occur

- A— when two surfaces fit tightly together but can move relative to one another.
- B— only when two dissimilar metals are in contact.
- C— when steel or bronze bushings are pressed into aluminum parts with too tight a fit.
- D— when two surfaces fit loosely together and can move relative to one another.

**7361.** Select the metal on which corrosion forms a greenish film.

- A— Copper and its alloy.
- B— Aluminum and its alloy.
- C— Steel and iron.
- D— Titanium and its alloy.

**7362.** Alodizing is a chemical treatment for aluminum alloys to improve their paint-bonding qualities and to

- A— decrease their corrosion resistance.
- B— make their surface slightly alkaline.
- C— relieve their surface stresses.
- D— increase their corrosion resistance.

**7363.** Metals and alloys of greatly differing composition should not be in direct contact with each other because

- A— of the possibility of generating static charges which interfere with radio reception.
- B— of the different rates of expansion.
- C— of their unequal tensile strengths.
- D— deterioration may result from electrochemical action at point of contact.

**7364.** How is alodine applied to aluminum alloys?

- A— As part of the priming process.
- B— By dipping.
- C— As part of the manufacturing process.
- D— Concurrently with the Alclad.

**7365.** The lifting or flaking of the metal at the surface due to delamination of grain boundaries caused by the pressure of corrosion residual product buildup is called

- A— brinelling.
- B— electrolysis.
- C— transgranulation.
- D— exfoliation.

**7366.** A nonelectrolytic chemical treatment for aluminum alloys to increase corrosion resistance and paint-bonding qualities is called

- A— parco lubricizing.
- B— anodizing.
- C— alodizing.
- D— dichromating.

**7367.** Why are parts rinsed thoroughly in hot water after they have been heat treated in a sodium and potassium nitrate bath?

- A— To prevent corrosion.
- B— To prevent blistering.
- C— To reduce warpage.
- D— To retard discoloration.

**7368.** Intergranular corrosion in structural aluminum alloy parts

- A— is not likely to occur in parts fabricated from heat-treated sheet aluminum.
- B— may be detected by the white, powdery deposit formed on the surface of the metal.
- C— is not likely to occur in parts fabricated from aluminum-coated alloys (Alclad or Pureclad).
- D— cannot always be detected by surface indications.

**7369.** What is used to remove corrosion from highly stressed steel surfaces?

- A— Steel wire brushes.
- B— Fine-grit aluminum oxide.
- C— High-speed wire buffing.
- D— Medium-grit carborundum paper.

**7370.** Intergranular corrosion is caused by

- A— improper heat treatment.
- B— dissimilar metal contact.
- C— improperly assembled components.
- D— poor application of zinc chromate primer.

**7371.** What type of corrosion may exist in aircraft structure and not be visible?

- A— Electrolytic corrosion.
- B— Bonderizing corrosion.
- C— Climatic condition corrosion.
- D— Surface corrosion.

**7372.** Corrosion should be removed from magnesium parts with a

- A— steel wire brush.
- B— carborundum abrasive.
- C— stiff, hog-bristle brush.
- D— steel burnishing tool.

**7373.** Why is it important not to rotate the propeller shaft after the final spraying of corrosion-preventive mixture into cylinders installed on removed engines?

- A— The link rods may be damaged by hydraulic lock.
- B— The corrosion preventive mixture will be excessively diluted.
- C— The engine may fire and cause injury to personnel.
- D— The seal of corrosion preventive mixture will be broken.



**7374.** Why is a plastic surface flushed with fresh water before it is cleaned with soap and water?

- A— To prevent crazing.
- B— To prevent scratching.
- C— To remove oil and grease.
- D— To prevent softening the plastic.

**7375.** What should be done to prevent rapid deterioration when a tire becomes covered with lubricating oil?

- A— Wipe the tire with a dry cloth, and then dry with compressed air.
- B— Wipe the tire with a dry cloth followed by a washdown with soap and water.
- C— Wash the tire with a petroleum solvent, and then dry with compressed air.
- D— Wash the tire with alcohol or lacquer thinner to neutralize the action of the oil.

**7376.** Galvanic action caused by dissimilar metal contact may best be prevented by

- A— placing a nonporous dielectric material between the surfaces.
- B— coating one surface with a light coat of primer.
- C— cleaning both surfaces with MEK (methyl ethyl ketone).
- D— application of paper tape between the surfaces.

**7377.** Corrosion caused by electrolytic action is the result of

- A— excessive anodization.
- B— contact between two unlike metals.
- C— the wrong quenching agent.
- D— excessive etching.

**7378.** To prevent corrosion between dissimilar metal joints in which magnesium alloy is involved,

- A— prime only the magnesium part with one coat of zinc chromate primer and put a leather gasket between the pieces.
- B— the magnesium part must be plated with the same metal as the part it will be in contact with.
- C— coat both mating surfaces with an aluminized varnish.
- D— prime both parts with two coats of zinc chromate primer and place a layer of pressure sensitive vinyl tape between them.

**7379.** The interior surface of sealed structural steel tubing is best protected against corrosion by

- A— purging the interior with dry air before sealing.
- B— a coating of hot linseed oil.
- C— evacuating the tubing before sealing.
- D— a coating of zinc chromate paint.

**7380.** Failure to quench a piece of aluminum in the minimum required time could result in

- A— failure of the Alclad to adhere properly.
- B— causing the aluminum to become extremely brittle.
- C— impairing the corrosion resisting qualities of the metal.
- D— difficulty in preparing the surface for painting.

**7381.** What power of ten is equal to 1,000,000?

- A— 10 to the third power.
- B— 10 to the fourth power.
- C— 10 to the fifth power.
- D— 10 to the sixth power.

**7382.** Find the square root of 1,746.

- A— 41.7852.
- B— 41.7752.
- C— 40.7742.
- D— 42.7854.

**7383.** The result of nine raised to the fourth power is

- A— 6,491.
- B— 6,461.
- C— 6,941.
- D— 6,561.

**7384.** Find the square root of 3,722.1835.

- A— 61.00971.
- B— 61.00.
- C— 60.009.
- D— 61.0097.

**7385.** Find the square root of 9,801.

- A—  $8,019 \times 3$  to the negative fourth power.
- B—  $80.19 \times 3$  to the negative fourth power.
- C—  $801.9 \times 3$  to the negative fourth power.
- D—  $.8019 \times 3$  to the fourth power.

7386. Find the square of 212.

- A— 40,144.
- B— 43,924.
- C— 44,944.
- D— 44,844.

7387. Find the value of ten raised to the negative sixth power.

- A— 0.000001.
- B— 0.000010.
- C— 0.0001.
- D— 0.00001.

7388. What is the square root of four raised to the fifth power?

- A— 32.
- B— 64.
- C— 16.
- D— 20.

7389. The number  $3.47 \times 10$  to the negative fourth power is equal to

- A— 3,470.00.
- B— 34,700.0.
- C— 0034.70.
- D— .000347.

7390. Which alternative answer is equal to 16,300?

- A—  $1.63 \times 10$  to the fourth power.
- B—  $1.63 \times 10$  to the negative third power.
- C—  $163 \times 10$  to the negative second power.
- D—  $1,630 \times 10$  to the negative first power.

7391. Find the square root of 124.9924.

- A—  $111.8 \times 10$  to the third power.
- B—  $.1118 \times 10$  to the negative second power.
- C—  $1,118 \times 10$  to the negative second power.
- D—  $11.186 \times 10$  to the negative third power.

7392. What is the square root of 16 raised to the fourth power?

- A— 1,024.
- B— 64.
- C— 4,096.
- D— 256.

7393. (Refer to figure 45.) Solve the equation.

- A— .0297.
- B— .1680.
- C— .7132.
- D— .0419.

7394. The result of seven raised to the third power plus the square root of 39 is equal to

- A— 349.24.
- B— 27.24.
- C— 343.24.
- D— 2,407.24.

7395. Find the square root of 1,824.

- A—  $42.708 \times 10$  to the negative second power.
- B— .42708.
- C— 4,270.8.
- D—  $.42708 \times 10$  to the second power.

7396. The total piston displacement of a specific engine is

- A— dependent on the compression ratio.
- B— dependent on the volumetric efficiency.
- C— the volume displaced by all the pistons during one revolution of the crankshaft.
- D— the total volume of all the cylinders.

7397. (Refer to figure 46.) Compute the area of the trapezoid.

- A— 52.5 square feet.
- B— 60 square feet.
- C— 84 square feet.
- D— 76.5 square feet.

7398. What size sheet of metal is required to fabricate a cylinder 20 inches long and 8 inches in diameter?

Note:  $C = 3.1416 \times D$

- A— 20" x 25-5/32".
- B— 20" x 24-9/64".
- C— 20" x 25-9/64".
- D— 20" x 24-5/32".



**7399.** (Refer to figure 47.) Find the area of the right triangle shown.

- A— 5 square inches.
- B— 6 square inches.
- C— 9 square inches.
- D— 12 square inches.

**7400.** What force is exerted on the piston in a hydraulic cylinder if the area of the piston is 1.2 square inches and the fluid pressure is 850 PSI?

- A— 1,020 pounds.
- B— 1,220 pounds.
- C— 960 pounds.
- D— 850 pounds.

**7401.** A rectangular-shaped fuel tank measures 60 inches in length, 30 inches in width, and 12 inches in depth. How many cubic feet are within the tank?

- A— 12.5.
- B— 15.0.
- C— 18.5.
- D— 21.0.

**7402.** Select the container size that will be equal in volume to 60 gallons of fuel.

(7.5 gal = 1 cu ft)

- A— 7.0 cubic feet.
- B— 7.5 cubic feet.
- C— 8.0 cubic feet.
- D— 8.5 cubic feet.

**7403.** (Refer to figure 48.) Compute the area of the trapezoid.

- A— 8 square feet.
- B— 24 square feet.
- C— 48 square feet.
- D— 10 square feet.

**7404.** (Refer to figure 49.) Determine the area of the triangle formed by points A, B, and C.

A to B = 7.5 inches  
A to D = 16.8 inches

- A— 7.07 square inches.
- B— 42 square inches.
- C— 63 square inches.
- D— 126 square inches.

**7405.** What is the piston displacement of a master cylinder with a 1.5-inch diameter bore and a piston stroke of 4 inches?

- A— 1.7671 cubic inches.
- B— 9.4247 cubic inches.
- C— 7.0686 cubic inches.
- D— 6.1541 cubic inches.

**7406.** How many gallons of fuel will be contained in a rectangular-shaped tank which measures 2 feet in width, 3 feet in length, and 1 foot 8 inches in depth?

(7.5 gal = 1 cu ft)

- A— 66.6.
- B— 75.
- C— 110.
- D— 45.

**7407.** A rectangular-shaped fuel tank measures 27-1/2 inches in length, 9 inches in width, and 8-1/4 inches in depth. How many gallons will the tank contain?

(231 cu in = 1 gal)

- A— 18.8.
- B— 6.4.
- C— 8.8.
- D— 16.4.

**7408.** A four-cylinder aircraft engine has a cylinder bore of 3.78 inches and is 8.5 inches deep. With the piston on bottom center, the top of the piston measures 4.0 inches from the bottom of the cylinder. What is the approximate piston displacement of this engine?

- A— 200 cubic inches.
- B— 360 cubic inches.
- C— 320 cubic inches.
- D— 235 cubic inches.

**7409.** A rectangular-shaped fuel tank measures 37-1/2 inches in length, 14 inches in width, and 8-1/4 inches in depth. How many cubic inches are within the tank?

- A— 525.
- B— 433.125.
- C— 4,331.25.
- D— 309.375.

**7410.** A six-cylinder engine with a bore of 3.5 inches, a cylinder height of 7 inches and a stroke of 4.5 inches will have a total piston displacement of

- A— 256.88 cubic inches.
- B— 259.77 cubic inches.
- C— 404 cubic inches.
- D— 43.3 cubic inches.

**7411.** Select the fraction which is equal to .020.

- A—  $3/16$ .
- B—  $1/5$ .
- C—  $2/7$ .
- D—  $1/50$ .

**7412.** Select the decimal which is equal to the mixed number  $1-7/32$ .

- A— 1.2188.
- B— 1.3932.
- C— 1.7320.
- D— 1.3270.

**7413.** If the volume of a cylinder with the piston at bottom center is 84 cubic inches and the piston displacement is 70 cubic inches, then the compression ratio is

- A— 7 to 1.
- B— 1.2 to 1.
- C— 6 to 1.
- D— 1.9 to 1.

**7414.** Express  $7/8$  as a percent.

- A— .785 percent.
- B— 78.5 percent.
- C— .875 percent.
- D— 87.5 percent.

**7415.** What is the speed of a spur gear with 42 teeth driven by a pinion gear with 14 teeth turning 420 RPM?

- A— 14 RPM.
- B— 42 RPM.
- C— 160 RPM.
- D— 140 RPM.

**7416.** An engine develops 108 horsepower at 87 percent power. What horsepower would be developed at 65 percent power?

- A— 80.
- B— 94.
- C— 70.
- D— 64.

**7417.** Which alternative is the decimal equivalent of the fraction  $43/32$ ?

- A— 1.34375.
- B— 1.43325.
- C— 1.32435.
- D— 1.74415.

**7418.** Select the fractional equivalent for a 0.09375-thick sheet of aluminum.

- A—  $5/64$ .
- B—  $5/32$ .
- C—  $3/64$ .
- D—  $3/32$ .

**7419.** Express  $5/8$  as a percent.

- A— 62 percent.
- B— .625 percent.
- C— .620 percent.
- D— 62.5 percent.

**7420.** Select the decimal which is most nearly equal to  $77/64$ .

- A— 1.8311.
- B— 0.8311.
- C— 1.2031.
- D— 1.3120.

**7421.** An airplane flying a distance of 875 miles used 70 gallons of gasoline. How many gallons will it need to travel 3,000 miles?

- A— 108 gallons.
- B— 120 gallons.
- C— 240 gallons.
- D— 144 gallons.

**7422.** What is the speed ratio of a gear with 36 teeth meshed to a gear with 20 teeth?

- A— 5 to 12.
- B— 6.6 to 12.
- C— 5 to 9.
- D— 10 to 17.



**7423.** A pinion gear with 14 teeth is driving a spur gear with 42 teeth at 140 RPM. Determine the speed of the pinion gear.

- A— 588 RPM.
- B— 196 RPM.
- C— 420 RPM.
- D— 240 RPM.

**7424.** The parts department's profit is 12 percent on a new magneto. How much does the magneto cost if the selling price is \$145.60?

- A— \$128.12.
- B— \$120.00.
- C— \$125.60.
- D— \$130.00.

**7425.** An engine of 125 horsepower maximum is running at 65 percent power. What is the horsepower being developed?

- A— 93.05.
- B— 30.85.
- C— 81.25.
- D— 38.85.

**7426.** An engine of 98 horsepower maximum is running at 75 percent power. What is the horsepower being developed?

- A— 87.00.
- B— 33.30.
- C— 73.50.
- D— 41.30.

**7427.** A blueprint shows a hole of 0.17187 to be drilled. Which fraction size drill bit is most nearly equal?

- A— 11/64.
- B— 9/64.
- C— 9/32.
- D— 11/32.

**7428.** Which decimal is most nearly equal to a bend radius of  $31/64$ ?

- A— 0.0645.
- B— 0.6450.
- C— 0.48437.
- D— 0.3164.

**7429.** Sixty-five engines are what percent of 80 engines?

- A— 71 percent.
- B— 81 percent.
- C— 65 percent.
- D— 52 percent.

**7430.** The radius of a piece of round stock is  $7/32$ . Select the decimal which is most nearly equal to the diameter.

- A— 0.2187.
- B— 0.5343.
- C— 0.4375.
- D— 0.3531.

**7431.** Maximum engine life is 900 hours. Recently, 27 engines were removed with an average life of 635.3 hours. What percent of the maximum engine life has been achieved?

- A— 71 percent.
- B— 72 percent.
- C— 73 percent.
- D— 74 percent.

**7432.** What is the ratio of 10 feet to 30 inches?

- A— 4:1.
- B— 1:3.
- C— 1:4.
- D— 3:1.

**7433.** How much current does a 30-volt motor,  $1/2$  horsepower, 85 percent efficient, draw from the bus?

(Note: 1 horsepower = 746 watts.)

- A— 14.6 amperes.
- B— 12.4 amperes.
- C— 12.3 amperes.
- D— 14.1 amperes.

**7434.** Solve the equation.

$$[(4 \times -3) + (-9 \times 2)] \div 2 =$$

- A— 0.
- B— -30.
- C— -15.
- D— -5.

7435. Solve the equation.

$$(64 \times 3/8) \div 3/4 =$$

- A— 16.
- B— 24.
- C— 32.
- D— 72.

7436. Solve the equation.

$$(32 \times 3/8) \div 1/6 =$$

- A— 16.
- B— 12.
- C— 2.
- D— 72.

7437. What is the ratio of a gasoline fuel load of 200 gallons to one of 1,680 pounds?

- A— 3:7.
- B— 5:7.
- C— 2:3.
- D— 5:42.

7438. Solve the equation.

$$2/4 (30 + 34) 5 =$$

- A— 117.
- B— 160.
- C— 345.
- D— 640.

7439. (Refer to figure 50.) Solve the equation.

- A— 16.51.
- B— 174.85.
- C— -81.49.
- D— 14.00.

7440. (Refer to figure 51.) Solve the equation.

- A— +31.25.
- B— -5.20.
- C— -31.25.
- D— +6.05.

7441. Solve the equation.

$$4 - 3[-6(2+3) + 4] =$$

- A— 82.
- B— 33.
- C— -25.
- D— -71.

7442. Solve the equation.

$$-6[-9(-8+4) - 2(7 + 3)] =$$

- A— 16.
- B— -332.
- C— 216.
- D— -96.

7443. Solve the equation.

$$(-3 + 2)(-12 - 4) + (-4 + 6) \times 2$$

- A— 20.
- B— 40.
- C— 35.
- D— 28.

7444. (Refer to figure 52.) Solve the equation.

- A— -11.7.
- B— 11.9.
- C— 11.7.
- D— 11.09.

7445. Which provides a place for indicating compliance with Airworthiness Directives or manufacturers' service bulletins?

- A— Structural repair manual.
- B— Aircraft overhaul manual.
- C— Aircraft maintenance records.
- D— Illustrated parts catalog.

7446. An aircraft was not approved for return to service after an annual inspection and the owner wanted to fly the aircraft to another maintenance base. Which statement is correct?

- A— The owner must obtain a special flight permit.
- B— The aircraft must be repaired and approved prior to any flight.
- C— The aircraft may be flown to another maintenance base if the discrepancies are not "safety of flight" items.
- D— The owner must obtain a restricted category type certificate.



**7447.** When should special inspection procedures be followed to determine if any damage to the aircraft structure has occurred?

- A— Progressive inspection.
- B— 100-hour inspection.
- C— Overweight landing.
- D— Annual inspection.

**7448.** During an annual inspection, if a defect is found which makes the aircraft unairworthy, the person disapproving must

- A— remove the Airworthiness Certificate from the aircraft.
- B— submit a Malfunction or Defect Report.
- C— provide a written notice of the defect to the owner.
- D— repair the defect before completion of the inspection.

**7449.** What is the means by which the FAA notifies aircraft owners and other interested persons of unsafe conditions and prescribes the condition under which the product may continue to be operated?

- A— Airworthiness Directives.
- B— Supplemental Type Certificates.
- C— Malfunction or Defect Reports.
- D— Technical Standard Orders.

**7450.** Which is an appliance major repair?

- A— Overhaul of a hydraulic pressure pump.
- B— Repairs to a propeller governor or its control.
- C— Troubleshooting and repairing broken circuits in landing light circuits.
- D— Cleaning of balloon burner pilot and main nozzles in accordance with the manufacturer's instructions.

**7451.** Where should you find this entry?

“Removed right wing from aircraft and removed skin from outer 6 feet. Repaired buckled spar 49 inches from tip in accordance with figure 8 in the manufacturer's structural repair manual No. 28-1.”

- A— Aircraft engine maintenance record.
- B— Airworthiness Directives compliance record.
- C— FAA Form 337.
- D— Service bulletin compliance record.

**7452.** Which maintenance action is an airframe major repair?

- A— Removal, installation, and repair of landing gear tires.
- B— Changes to the wing or to fixed or movable control surfaces which affect flutter and vibration characteristics.
- C— Rewinding the field coil of an electrical accessory.
- D— The repair of portions of skin sheets by making additional seams.

**7453.** Which aircraft record entry is the best description of the replacement of several damaged heli-coils in a casting?

- A— Eight 1/4 — 20 inch standard heli-coils were replaced using like replacements.
- B— Eight 1/4 — 20 inch standard heli-coils were replaced. The damaged inserts were extracted, the tapped holes gaged, then new inserts installed, and tangs removed.
- C— Eight 1/4 — 20 inch heli-coils were installed in place of damaged ones.
- D— Eight 1/4 — 20 inch standard heli-coil inserts were repaired by replacing the damaged inserts with a lock-type insert, after the tapped holes were checked for corrosion.

**7454.** Which maintenance record entry best describes the action taken for a control cable showing approximately 20 percent wear on several of the individual outer wires at a fairlead?

- A— Wear within acceptable limits, repair not necessary.
- B— Removed and replaced the control cable and rerigged the system.
- C— Cable wrapped at wear point with PVC tape.
- D— Cable repositioned to move worn area away from fairlead.

**7455.** Which maintenance record entry best describes the action taken for a .125-inch deep dent in a straight section of 1/2-inch aluminum alloy tubing?

- A— Dent within acceptable limits, repair not necessary.
- B— Dent removed by burnishing.
- C— Dented section removed and replaced with identical new tubing flared to 45°.
- D— Dent removed by drawing the appropriate size bullet through the tube.

**7456.** Which aircraft record entry best describes a repair of a dent in a tubular steel structure dented at a cluster?

- A— Removed and replaced all the members of the cluster.
- B— Removed and replaced the damaged member.
- C— Welded a reinforcing plate over the dented area.
- D— Filled the damaged area with a molten metal and dressed to the original contour.

**7457.** Who is responsible for making the entry in the maintenance records after an annual, 100 hour, or progressive inspection?

- A— Any certificated airframe mechanic.
- B— The owner or operator of the aircraft.
- C— The person approving or disapproving for return to service.
- D— The pilot performing the test flight.

**7458.** An aircraft owner was provided a list of discrepancies on an aircraft that was not approved for return to service after an annual inspection. Which statement is correct concerning who may correct the discrepancies?

- A— Only a mechanic with an inspection authorization.
- B— An appropriately rated mechanic.
- C— Any certificated repair station.
- D— The owner or operator of the aircraft.

**7459.** When entering a major repair in an aircraft logbook, a mechanic must enter

- A— the date the major repair was started.
- B— total time in service for the aircraft.
- C— his or her name and date the work was performed.
- D— total aircraft time since the last overhaul.

**7460.** What action is required when a minor repair is performed on a certificated aircraft?

- A— An FAA Form 337 must be completed.
- B— The aircraft specifications must be amended.
- C— An entry in the aircraft's permanent records is required.
- D— The owner of the aircraft must report the repair to the FAA.

**7461.** After making a major repair to an aircraft engine that is to be returned to service, FAA Form 337, must be prepared. How many copies are required and what is the disposition of the completed forms?

- A— Two; both copies for the FAA.
- B— Two; one copy for the aircraft owner and one copy for the FAA.
- C— Three; one copy for the aircraft owner and two copies for the FAA.
- D— Three; one copy for the aircraft owner, one copy for the FAA, and one copy for the permanent records of the repairing agency or individual.

**7462.** Who is responsible for maintaining the required maintenance records for an airplane?

- A— Authorized inspector.
- B— Repair station operator.
- C— Certificated mechanic.
- D— Aircraft owner.

**7463.** Each person performing an annual or 100-hour inspection shall use a checklist that contains at least those items in the appendix of

- A— FAR Part 43.
- B— FAR Part 65.
- C— FAR Part 91.
- D— AC 43.13-3.

**7464.** An FAA Form 337 is used to record and document

- A— preventive and routine maintenance.
- B— major repairs and major alterations.
- C— minor repairs and minor alterations.
- D— Airworthiness Directive compliance.

**7465.** After a mechanic holding an airframe and powerplant rating completes a 100-hour inspection, what action is required before the aircraft is returned to service?

- A— Obtain a renewal for the Airworthiness Certificate.
- B— Make the proper entries in the aircraft's maintenance record.
- C— Complete an operational check of all systems.
- D— A mechanic with an inspection authorization must approve the inspection.



**7466.** A certificated airframe and powerplant mechanic is authorized to approve an aircraft for return to service after a

- A— 100-hour inspection.
- B— certification inspection.
- C— major alteration.
- D— major repair.

**7467.** The force that can be produced by an actuating cylinder whose piston has a cross-sectional area of 3 square inches operating in a 1,000 PSI hydraulic system is most nearly

- A— 300 pounds.
- B— 3,000 pounds.
- C— 334 pounds.
- D— 1,000 pounds.

**7468.** The boiling point of a given liquid varies

- A— inversely with volume.
- B— directly with pressure.
- C— inversely with pressure.
- D— directly with volume.

**7469.** Which of the following equals 1 horsepower?

- A— 2,000 foot-pounds of work per minute.
- B— 550 foot-pounds of work per minute.
- C— 2,000 foot-pounds of work per second.
- D— 33,000 foot-pounds of work per minute.

**7470.** Which of the following is NOT considered a method of heat transfer?

- A— Convection.
- B— Conduction.
- C— Diffusion.
- D— Radiation.

**7471.** An engine that weighs 350 pounds is removed from an aircraft by means of a mobile hoist. The engine is raised 3 feet above its attachment mount, and the entire assembly is then moved forward 12 feet. A constant force of 70 pounds is required to move the loaded hoist. What is the total work input required to move the hoist?

- A— 840 foot-pounds.
- B— 22,680 foot-pounds.
- C— 1,890 foot-pounds.
- D— 1,050 foot-pounds.

**7472.** Which condition is the actual amount of water vapor in a mixture of air and water?

- A— Relative humidity.
- B— Dewpoint.
- C— Absolute humidity.
- D— Vapor pressure.

**7473.** Under which conditions will the rate of flow of a liquid through a metering orifice (or jet) be the greatest?

- A— Unmetered pressure — 18 PSI, metered pressure — 17.5 PSI, atmospheric pressure — 14.5 PSI.
- B— Unmetered pressure — 23 PSI, metered pressure — 12 PSI, atmospheric pressure — 14.3 PSI.
- C— Unmetered pressure — 17 PSI, metered pressure — 5 PSI, atmospheric pressure — 14.7 PSI.
- D— Unmetered pressure — 15 PSI, metered pressure — 12 PSI, atmospheric pressure — 14.7 PSI.

**7474.** (Refer to figure 53.) The amount of force applied to rope A to lift the weight is

- A— 12 pounds.
- B— 15 pounds.
- C— 20 pounds.
- D— 30 pounds.

**7475.** Which will weigh the least?

- A— 98 parts of dry air and 2 parts of water vapor.
- B— 35 parts of water vapor and 65 parts of dry air.
- C— 100 parts of dry air.
- D— 50 parts of dry air and 50 parts of water vapor.

**7476.** Which is the ratio of the water vapor actually present in the atmosphere to the amount that would be present if the air were saturated at the prevailing temperature and pressure?

- A— Absolute humidity.
- B— Relative humidity.
- C— Dewpoint.
- D— Vapor pressure.

7477. The speed of sound in the atmosphere

- A— is constant under all conditions.
- B— varies according to the frequency of the sound.
- C— changes with a change in temperature.
- D— changes with a change in pressure.

7478. If the volume of a confined gas is doubled (without the addition of more gas), the pressure will (assume the temperature remains constant)

- A— increase in direct proportion to the volume increase.
- B— remain the same.
- C— be doubled.
- D— be reduced to one-half its original value.

7479. If the temperature of a confined liquid is held constant and its pressure is tripled, the volume will

- A— triple.
- B— be increased one-third its original volume.
- C— be reduced to one-third its original volume.
- D— remain the same.

7480. How much work input is required to lower (not drop) a 120-pound weight from the top of a 3-foot table to the floor?

- A— 120 pounds of force.
- B— 120 foot-pounds.
- C— 360 foot-pounds.
- D— 40 foot-pounds.

7481. Which atmospheric conditions will cause the true landing speed of an aircraft to be the greatest?

- A— Low temperature with high humidity.
- B— Low temperature with low humidity.
- C— High temperature with low humidity.
- D— High temperature with high humidity.

7482. If the fluid pressure is 800 PSI in a 1/2-inch line supplying an actuating cylinder with a piston area of 10 square inches, the force exerted on the piston will be

- A— 4,000 pounds.
- B— 1,600 pounds.
- C— 8,000 pounds.
- D— 800 pounds.

7483. How many, if any, factors are necessary to determine power?

1. Force exerted.
2. Distance the force moves.
3. Time required to do the work.

- A— None.
- B— One.
- C— Two.
- D— Three.

7484. What force must be applied to roll a 120-pound barrel up an inclined plane 9 feet long to a height of 3 feet (disregard friction)?

$$L \div I = R \div E$$

L = Length of ramp, measured along the slope.

I = Height of ramp.

R = Weight of object to be raised or lowered.

E = Force required to raise or lower object.

- A— 40 pounds.
- B— 120 pounds.
- C— 360 pounds.
- D— 393 pounds.

7485. Which statement concerning heat and/or temperature is true?

- A— Temperature is a form of energy that causes molecular agitation within a material.
- B— There is an inverse relationship between temperature and heat.
- C— Temperature is a measure of the kinetic energy of the molecules of any substance.
- D— Temperature is a measure of the potential energy of the molecules of any substance.

7486. What is absolute humidity?

- A— The portion of atmospheric pressure that is exerted by the moisture in the air.
- B— The temperature to which humid air must be cooled at constant pressure to become saturated.
- C— The actual amount of the water vapor in a mixture of air and water.
- D— The ratio of the water vapor actually present in the atmosphere to the amount that would be present if the air were saturated at the prevailing temperature and pressure.



**7487.** The temperature to which humid air must be cooled at constant pressure to become saturated is called

- A— dewpoint.
- B— vapor pressure.
- C— absolute humidity.
- D— relative humidity.

**7488.** If both the volume and the absolute temperature of a confined gas are doubled, the pressure will

- A— not change.
- B— be doubled.
- C— be halved.
- D— become four times as great.

**7489.** Airworthiness Directives are issued to

- A— provide temporary maintenance procedure.
- B— prescribe airman privileges and limitations.
- C— present suggested maintenance procedures.
- D— correct an unsafe condition.

**7490.** (1) A Supplemental Type Certificate may be issued to more than one applicant for the same design change, providing each applicant shows compliance with the applicable airworthiness requirement.

(2) An installation of an item manufactured in accordance with the Technical Standard Order system requires no further approval for installation in a particular aircraft.

Regarding the above statements,

- A— only No. 2 is true.
- B— both No. 1 and No. 2 are true.
- C— neither No. 1 nor No. 2 is true.
- D— only No. 1 is true.

**7491.** For all aircraft type certificated prior to January 1, 1958, the CAA issued documents known as Aircraft Specifications which contained technical information about the aircraft type. If an aircraft was type certificated May 7, 1959, the information that would formerly have been contained in the Aircraft Specifications will be in the appropriate

- A— Aircraft Operation Information Letters.
- B— Certificated Aircraft Bulletins.
- C— Type Certificate Data Sheets.
- D— Aviation Airworthiness Alerts.

**7492.** Airworthiness Directives are issued by the

- A— National Transportation Safety Board.
- B— Air Transport Association.
- C— manufacturers.
- D— FAA.

**7493.** An aircraft Type Certificate Data Sheet contains

- A— maximum fuel grade to be used.
- B— all pertinent minimum weights.
- C— control surface adjustment points.
- D— location of the datum.

**7494.** Suitability for use of a specific propeller with a particular engine-airplane combination can be determined by reference to what informational source?

- A— Propeller Listing.
- B— Propeller Specifications.
- C— Aircraft Specifications or Type Certificate Data Sheet.
- D— Alphabetical Index of Current Propeller Type Certificate Data Sheets, Specifications, and Listings.

**7495.** If an airworthy aircraft is sold, what is done with the Airworthiness Certificate?

- A— It must be endorsed by a certificated mechanic to indicate that the aircraft is still airworthy.
- B— It becomes invalid until the aircraft is reinspected and returned to service.
- C— It is declared void and a new certificate is issued upon application by the new owner.
- D— It is transferred with the aircraft.

**7496.** Airworthiness Directives

- A— are mandatory.
- B— present design changes.
- C— provide temporary maintenance procedures.
- D— provide suggested maintenance procedures.

**7497.** The issuance of an Airworthiness Certificate is governed by

- A— FAR Part 23.
- B— FAR Part 21.
- C— FAR Part 25.
- D— FAR Part 39.

**7498.** Specifications pertaining to an aircraft, of which a limited number were manufactured under a type certificate and for which there is no current Aircraft Specification, can be found in the

- A— Alphabetical Index of Antique Aircraft.
- B— Aircraft Listing.
- C— FAA Statistical Handbook of Civil Airplane Specifications.
- D— Annual Summary of Deleted and Discontinued Aircraft Specifications.

**7499.** Where are technical descriptions of certificated propellers found?

- A— Applicable Airworthiness Directives.
- B— Aircraft Listings.
- C— Aircraft Specifications.
- D— Propeller Type Certificate Data Sheets.

**7500.** What information is generally contained in Aircraft Specifications or Type Certificate Data Sheets?

- A— Empty weight of the aircraft.
- B— Useful load of aircraft.
- C— Payload of aircraft.
- D— Control surface movements.

**7501.** Placards required on an aircraft are specified in

- A— AC 43.13-1A.
- B— the aircraft logbook.
- C— FAR's under which the aircraft was type certificated.
- D— Aircraft Specifications or Type Certificate Data Sheets.

**7502.** Technical information about older aircraft models, of which no more than 50 remain in service, can be found in the

- A— Aircraft Listing.
- B— Annual Summary of Deleted and Discontinued Aircraft Specifications.
- C— Alphabetical Index of Antique Aircraft.
- D— FAA Statistical Handbook of Civil Airplane Specifications.

**7503.** (1) The FAR's require approval after compliance with the data of a Supplemental Type Certificate.

(2) An installation of an item manufactured in accordance with the Technical Standard Order system requires no further approval for installation in a particular aircraft.

Regarding the above statements,

- A— only No. 2 is true.
- B— both No. 1 and No. 2 are true.
- C— neither No. 1 nor No. 2 is true.
- D— only No. 1 is true.

**7504.** Which regulation provides information regarding instrument range markings for an airplane certificated in the normal category?

- A— FAR Part 21.
- B— FAR Part 25.
- C— FAR Part 91.
- D— FAR Part 23.

**7505.** (1) Propellers are NOT included in the Airworthiness Directive system.

(2) A certificated powerplant mechanic may make a minor repair on an aluminum propeller and approve for return to service.

Regarding the above statements,

- A— only No. 1 is true.
- B— only No. 2 is true.
- C— both No. 1 and No. 2 are true.
- D— neither No. 1 nor No. 2 is true.

**7506.** An aircraft mechanic is privileged to perform major alterations on U.S. certificated aircraft; however, the work must be done in accordance with FAA-approved technical data before the aircraft can be returned to service. Which is NOT approved data?

- A— Airworthiness Directives.
- B— AC 43.13-2A.
- C— Type Certificate Data Sheets.
- D— Supplemental Type Certificates.



**7507.** What is the maintenance recording responsibility of the person who complies with an Airworthiness Directive?

- A— Advise the aircraft owner/operator of the work performed.
- B— Make an entry in the maintenance record of that equipment.
- C— Advise the FAA district office of the work performed, by submitting an FAA Form 337.
- D— Record of entry is not required of the person performing the work. The aircraft owner/operator is responsible for recording maintenance.

**7508.** (1) Manufacturer's data and FAA publications such as Airworthiness Directives, Type Certificate Data Sheets, and advisory circulars are all approved data.

(2) FAA publications such as Technical Standard Orders, Airworthiness Directives, Type Certificate Data Sheets, and Aircraft Specifications and Supplemental Type Certificates are all approved data.

Regarding the above statements,

- A— both No. 1 and No. 2 are true.
- B— only No. 1 is true.
- C— neither No. 1 nor No. 2 is true.
- D— only No. 2 is true.

**7509.** The Air Transport Association of America (ATA) Specification No. 100

(1) establishes a standard for the presentation of technical data in maintenance manuals.

(2) divides the aircraft into numbered systems and subsystems in order to simplify locating maintenance instructions.

Regarding the above statements,

- A— both No. 1 and No. 2 are true.
- B— neither No. 1 nor No. 2 is true.
- C— only No. 1 is true.
- D— only No. 2 is true.

**7510.** General Aviation Airworthiness Alerts

- A— provide mandatory procedures to prevent or correct serious aircraft problems.
- B— provide information about aircraft problems and suggested corrective actions.
- C— provide temporary emergency procedures until Airworthiness Directives can be issued.
- D— are issued by manufacturers to make pilots and mechanics aware of forthcoming service bulletins.

**7511.** The following is the compliance portion of an Airworthiness Directive. "Compliance required as indicated, unless already accomplished:

I. Aircraft with less than 500-hours' total time in service: Inspect in accordance with instructions below at 500-hours' total time, or within the next 50-hours' time in service after the effective date of this AD, and repeat after each subsequent 200 hours in service.

II. Aircraft with 500-hours' through 1,000-hours' total time in service: Inspect in accordance with instructions below within the next 50-hours' time in service after the effective date of this AD, and repeat after each subsequent 200 hours in service.

III. Aircraft with more than 1,000-hours' time in service: Inspect in accordance with instructions below within the next 25-hours' time in service after the effective date of this AD, and repeat after each subsequent 200 hours in service."

An aircraft has a total time in service of 468 hours. The Airworthiness Directive given was initially complied with at 454 hours in service. How many additional hours in service may be accumulated before the Airworthiness Directive must again be complied with?

- A— 32.
- B— 46.
- C— 200.
- D— 186.

**7512.** (Refer to figure 54.) Which type of lubricant is used for the nose door link?

- A— Oil, general purpose, low temperature lubricating.
- B— Grease, general purpose.
- C— Oil, lubricating, aircraft engine.
- D— Grease, low temperature aircraft lubricating.

**7513.** (Refer to figure 54.) Determine the frequency of lubrication of the pivot bushing.

- A— 100 hours.
- B— 50 hours.
- C— 500 hours.
- D— 1,000 hours.

**7514.** (Refer to figure 54.) What method is used to lubricate the nose door links?

- A— Filler can.
- B— Grease gun.
- C— Hand.
- D— Squirt can.

**7515.** The following is a table of airspeed limits as given in an FAA-issued aircraft specification:

Normal operating speed . . . . .	260 knots
Never-exceed speed . . . . .	293 knots
Maximum landing gear operation speed	174 knots
Maximum flap extended speed . . . . .	139 knots

The high end of the white arc on the airspeed instrument would be at

- A— 260 knots.
- B— 293 knots.
- C— 174 knots.
- D— 139 knots.

**7516.** A complete detailed inspection and adjustment of the valve mechanism will be made at the first 25 hours after the engine has been placed in service. Subsequent inspections of the valve mechanism will be made each second 50-hour period.

From the above statement, at what intervals will valve mechanism inspections be performed?

- A— 100 hours.
- B— 25 hours.
- C— 50 hours.
- D— 75 hours.

**7517.** Check thrust bearing nuts for tightness on new or newly overhauled engines at the first 50-hour inspection following installation. Subsequent inspections on thrust bearing nuts will be made at each third 50-hour inspection.

From the above statement, at what intervals should you check the thrust bearing nut for tightness?

- A— 150 hours.
- B— 50 hours.
- C— 100 hours.
- D— 200 hours.

**7518.** Which statement is true regarding the privileges of certificated mechanics with a powerplant rating?

- A— They may perform the 100-hour inspection required by the FAR's on a powerplant or propeller or any component thereof, but may not release the same to service.
- B— They may perform the annual inspection required by the FAR's on a powerplant or propeller or any component thereof, and may release the same to service.
- C— They may perform the annual inspection required by the FAR's on airframe, powerplant, or propeller or any component thereof, and may release the same to service.
- D— They may perform the 100-hour inspection required by the FAR's on a powerplant or propeller or any component thereof, and may release the same to service.

**7519.** Who has the authority to approve an aircraft for return to service after a 100-hour inspection?

- A— A mechanic of any certificated repair station.
- B— A certificated mechanic with an airframe rating.
- C— A mechanic holding a repairman certificate.
- D— A certificated mechanic with an airframe and powerplant rating.



**7520.** A repair, as performed on an airframe, shall mean

- A— the upkeep and preservation of the airframe including the component parts thereof.
- B— the restoration of the airframe to a condition for safe operation after damage or deterioration.
- C— an appreciable change in the weight, balance, structural strength, performance, flight characteristics, or other qualities affecting the airworthiness of the airframe.
- D— simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations.

**7521.** The replacement of fabric on fabric-covered parts such as wings, fuselages, stabilizers, or control surfaces is considered to be a

- A— minor repair unless the new cover is different in any way from the original cover.
- B— minor repair unless the underlying structure is altered or repaired.
- C— major repair even though no other alteration or repair is performed.
- D— minor repair unless the method of covering is changed or the underlying structure is altered or repaired.

**7522.** Which is classified as a major repair?

- A— Removal, installation, and repair of landing gear tires.
- B— The repair of portions of skin sheets by making additional seams.
- C— Troubleshooting and repairing broken circuits in landing light wiring circuits.
- D— Replacing safety belts.

**7523.** The 100-hour inspection required by FAR's for certain aircraft being operated for hire may be performed by

- A— persons working under the supervision of an appropriately rated mechanic, but the aircraft must be approved by the mechanic for return to service.
- B— appropriately rated mechanics only if they have an inspection authorization.
- C— appropriately rated mechanics and approved by them for return to service.
- D— appropriately rated mechanics, but the aircraft must be approved for return to service by a mechanic with an inspection authorization.

**7524.** A person working under the supervision of a certificated mechanic with an airframe and powerplant rating is not authorized to perform

- A— repair of fabric covering involving an area greater than that required to repair two adjacent wing ribs.
- B— repair of a wing brace strut by welding.
- C— a 100-hour inspection.
- D— repair of an engine mount by riveting.

**7525.** Certificated mechanics, under their general certificate privileges, may

- A— perform minor repairs to instruments.
- B— perform 100-hour inspection of instruments.
- C— perform minor alterations to instruments.
- D— not install instruments.

**7526.** An Airworthiness Directive requires that a propeller be altered. Certificated mechanics could

- A— perform and approve the work for return to service if it is a minor alteration.
- B— not approve the work for return to service because it is an alteration.
- C— not perform the work because it is an alteration.
- D— not perform the work because they are not allowed to perform and approve for return to service, repairs or alterations to propellers.

**7527.** The replacement of a damaged vertical stabilizer with a new identical stabilizer purchased from the aircraft manufacturer is considered a

- A— major alteration.
- B— minor alteration.
- C— major repair.
- D— minor repair.

**7528.** FAA certificated mechanics may

- A— approve for return to service a major repair for which they are rated.
- B— supervise and approve a 100-hour inspection.
- C— perform an annual inspection appropriate to the rating(s) they hold.
- D— approve for return to service a minor alteration they have performed appropriate to the rating(s) they hold.

**7529.** A certificated mechanic with a powerplant rating may perform the

- A— annual inspection required by the FAR's on a powerplant or any component thereof and approve and return the same to service.
- B— 100-hour inspection required by the FAR's on a powerplant or any component thereof and approve and return the same to service.
- C— annual inspection required by the FAR's on an airframe, powerplant, or any component thereof and return the same to service.
- D— 100-hour inspection required by the FAR's on an airframe, powerplant, or any other component thereof and approve and return the same to service.

**7530.** What part of the FAR's prescribes the requirements for issuing mechanic certificates and associated ratings and the general operating rules for the holders of these certificates and ratings?

- A— FAR Part 43.
- B— FAR Part 91.
- C— FAR Part 1.
- D— FAR Part 65.

**7531.** A certificated mechanic shall not exercise the privileges of the certificate and rating unless, within the preceding 24 months, the Administrator has found that the certificate holder is able to do the work or the certificate holder has

- A— served as a mechanic under the certificate and rating for at least 18 months.
- B— served as a mechanic under the certificate and rating for at least 12 months.
- C— technically supervised other mechanics for at least 3 months.
- D— served as a mechanic under the certificate and rating for at least 6 months.

**7532.** (1) Certificated mechanics with an airframe rating may perform a minor repair to an airspeed indicator providing they have the necessary equipment available.

(2) Certificated mechanics with a powerplant rating may perform a major repair to a propeller providing they have the necessary equipment available.

Regarding the above statements,

- A— only No. 1 is true.
- B— neither No. 1 nor No. 2 is true.
- C— only No. 2 is true.
- D— both No. 1 and No. 2 are true.

**7533.** Who is responsible for determining that materials used in aircraft maintenance and repair are of the proper type and conform to the appropriate standards?

- A— The installing person or agency.
- B— The owner of the aircraft.
- C— The supplier of the material.
- D— The manufacturer of the aircraft.

**7534.** Which of these publications contains standards for protrusion of bolts, studs, and screws through self-locking nuts?

- A— AC 43.13-2.
- B— Aircraft Specifications or Type Certificate Data Sheets.
- C— ANC Bulletin No. 19.
- D— AC 43.13-1A.

**7535.** The replacement of a damaged engine mount with a new identical engine mount purchased from the aircraft manufacturer is considered a

- A— major alteration.
- B— minor alteration.
- C— major repair.
- D— minor repair.



**7536.** Who has the authority to approve for return to service a powerplant or propeller or any part thereof after a 100-hour inspection?

- A— A mechanic with a powerplant rating.
- B— A mechanic with an airframe rating.
- C— Any certificated repairman.
- D— Personnel of any certificated repair station.

**7537.** Instrument repairs may be performed

- A— by the instrument manufacturer only.
- B— by an FAA-approved instrument repair station.
- C— on airframe instruments by mechanics with an airframe rating.
- D— on powerplant instruments by mechanics with a powerplant rating.





## **APPENDIX 1**





# DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

## AVIATION MECHANIC GENERAL SUBJECT MATTER KNOWLEDGE CODES

To determine the knowledge area in which a particular question was incorrectly answered, compare the subject matter code(s) on AC Form 8080-2, Airmen Written Test Report, to the subject matter outline that follows. The total number of test items missed may differ from the number of subject matter codes shown on the AC Form 8080-2, since you may have missed more than one question in a certain subject matter code.

### Basic Electricity

- A01 Measure capacitance and inductance
- A02 Calculate and measure electrical power
- A03 Measure voltage, current, resistance, continuity, and leakage
- A04 Determine the relationship of voltage, current, and resistance in electrical circuits
- A05 Read and interpret electrical circuit diagrams
- A06 Inspect and service batteries

### Aircraft Drawings

- B01 Use drawings, symbols, and schematic diagrams
- B02 Draw sketches of repairs and alterations
- B03 Use blueprint information
- B04 Use graphs and charts

### Weight and Balance

- C01 Weigh aircraft
- C02 Perform complete weight-and-balance check and record data

### Fluid Lines and Fittings

- D01 Fabricate and install rigid and flexible fluid lines and fittings

### Materials and Processes

- E01 Identify and select appropriate nondestructive testing methods
- E02 Perform penetrant, chemical etching, and magnetic particle inspections
- E03 Perform basic heat-treating processes
- E04 Identify and select aircraft hardware and materials
- E05 Inspect and check welds
- E06 Perform precision measurements

### Ground Operation and Servicing

- F01 Start, ground operate, move, service, and secure aircraft
- F02 Identify and select fuels

### Cleaning and Corrosion Control

- G01 Identify and select cleaning materials
- G02 Perform aircraft cleaning and corrosion control

### Mathematics

- H01 Extract roots and raise numbers to a given power
- H02 Determine areas and volumes of various geometrical shapes
- H03 Solve ratio, proportion, and percentage problems
- H04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers

## Appendix 1

### Maintenance Forms and Records

- I01 Write descriptions of aircraft condition and work performed
- I02 Complete required maintenance forms, records, and inspection reports

### Basic Physics

- J01 Use the principles of simple machines; sound, fluid, and heat dynamics

### Maintenance Publications

- K01 Select and use FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations
- K02 Read technical data

### Mechanic Privileges and Limitations

- L01 Exercise mechanic privileges within the limitations prescribed by FAR Part 65

**NOTE:** AC 00-2, Advisory Circular Checklist, transmits the status of all FAA advisory circulars (AC's), as well as FAA internal publications and miscellaneous flight information such as AIM, Airport/Facility Directory, written test question books, and other material directly related to a certificate or rating. To obtain a free copy of the AC 00-2, send your request to:

U.S. Department of Transportation  
Utilization and Storage Section, M-443.2  
Washington, DC 20590



## ABBREVIATIONS AND REFERENCES

The following abbreviations are used to identify the reference associated with each test question listed in appendix 1.

ABS	—	Aircraft Basic Science - McGraw-Hill Book Co.
AC	—	Advisory Circular
AEE	—	Aircraft Electricity and Electronics - McGraw-Hill Book Co.
AP	—	Aircraft Powerplants - McGraw-Hill Book Co.
FAR	—	Federal Aviation Regulations
MBM	—	Marathon Battery Instruction Manual
EA-AB-1	—	Aircraft Batteries, Lead Acid/Nickel-Cadmium - International Aviation Publishers (IAP) Inc.
EA-ATD-2	—	Aircraft Technical Dictionary - IAP, Inc.
EA-ITP-GB	—	General Section Textbook - IAP, Inc.
EA-ITP-P	—	Powerplant Section Textbook - IAP, Inc.

### QUESTIONS AND REFERENCES

A01:	7032.	AEE	7066.	AC 65-9A	7099.	AC 65-9A	
7001.	AC 65-9A	7033.	AEE	7067.	AC 65-9A	7100.	AC 65-9A
7002.	AEE	7034.	AEE	7068.	AC 65-9A	7101.	AC 65-9A
7003.	AC 65-9A	7035.	AC 65-9A	7069.	AC 65-9A	B02:	
7004.	AC 65-9A	7036.	AC 65-9A	7070.	AC 65-9A	7102.	AC 65-9A
7005.	AC 65-9A	7037.	AC 65-9A	7071.	AC 65-9A	7103.	AC 65-9A
7006.	AEE	7038.	AC 65-9A	A06:		7104.	AC 65-9A
7007.	AEE	7039.	AC 65-9A	7072.	AC 65-9A	7105.	AC 65-9A
7008.	AC 65-9A	7040.	AC 65-9A	7073.	AC 43.13-1A	7106.	AC 65-9A
7009.	AC 65-9A	7041.	AC 65-9A	7074.	AC 43.13-1A	7107.	AC 65-9A
7010.	AC 65-9A	7042.	AC 65-9A	7075.	EA-ITP-GB	7108.	AC 65-9A
A02:		7043.	AC 65-9A	7076.	EA-ITP-GB	7109.	AC 65-9A
7011.	AC 65-9A	7044.	AC 65-9A	7077.	AEE	7110.	AC 65-9A
7012.	AC 65-9A	7045.	AC 65-9A	7078.	MBM	7111.	AC 65-9A
7013.	AEE	7046.	AC 65-9A	7079.	AC 65-9A	7112.	AC 65-9A
7014.	AC 65-9A	7047.	AC 65-9A	7080.	AC 65-9A	B03:	
7015.	AC 65-9A	7048.	AC 65-9A	7081.	AC 65-9A	7113.	AC 65-9A
7016.	AC 65-9A	7049.	AC 65-9A	7082.	AC 65-9A	7114.	AC 65-9A
7017.	AC 65-9A	7050.	AC 65-9A	7083.	EA-ITP-GB	7115.	AC 65-9A
7018.	AC 65-9A	7051.	AC 43.13-1A	7084.	EA-ITP-GB	7116.	AC 65-9A
7019.	AC 65-9A	A05:		7085.	AC 65-9A	7117.	AC 65-9A
7020.	AC 65-9A	7052.	AC 65-9A	7086.	MBM	7118.	AC 65-9A
A03:		7053.	AC 65-9A	7087.	MBM	7119.	AC 65-9A
7021.	AC 65-9A	7054.	AC 65-9A	7088.	EA-ITP-GB	7120.	AC 65-9A
7022.	AC 65-9A	7055.	AC 65-9A	7089.	AC 65-9A	7121.	AC 65-9A
7023.	AC 65-9A	7056.	AC 65-9A	7090.	EA-AB-1	7122.	AC 65-9A
7024.	AC 65-9A	7057.	AC 65-9A	7091.	EA-ITP-GB	7123.	AC 65-9A
7025.	AC 65-9A	7058.	AC 65-9A	B01:		7124.	AC 65-9A
7026.	AC 65-9A	7059.	AC 65-9A	7092.	AC 65-9A	7125.	AC 65-9A
7027.	AC 65-9A	7060.	AC 65-9A	7093.	AC 65-9A	7126.	EA-ITP-GB
7028.	AC 65-9A	7061.	AC 65-9A	7094.	AC 65-9A	7127.	EA-ITP-GB
7029.	AC 43.13-1A	7062.	AC 65-9A	7095.	AC 65-9A	7128.	EA-ITP-GB
7030.	AC 65-9A	7063.	AC 65-9A	7096.	AC 65-9A	7129.	EA-ITP-GB
A04:		7064.	AC 65-9A	7097.	AC 65-9A	7130.	EA-ITP-GB
7031.	AEE	7065.	AC 65-9A	7098.	AC 65-9A	7131.	EA-ITP-GB

Appendix 1

7132. ABS	7184. AC 43.13-1A	7236. AC 65-9A	7288. AC 65-15A
B04:	7185. AC 65-9A	7237. AC 65-9A	7289. AC 65-15A
7133. AC 65-9A	D01:	7238. AC 65-9A	7290. AC 43.13-1A
7134. AC 65-9A	7186. AC 65-9A	7239. AC 65-9A	7291. AC 65-15A
7135. AC 65-9A	7187. AC 65-9A	7240. AC 43.13-1A	7292. AC 65-15A
7136. AC 43.13-1A	7188. AC 65-9A	7241. AC 65-9A	7293. AC 65-15A
7137. AC 65-9A	7189. ABS	7242. AC 65-9A	7294. AC 65-9A
7138. AC 43.13-1A	7190. AC 65-9A	7243. AC 65-9A	E06:
7139. AC 43.13-1A	7191. AC 65-9A	7244. AC 65-9A	7295. EA-ATD-2 & AP
7140. AC 65-15A	7192. AC 65-9A	7245. AC 65-9A	7296. AC 65-9A
7141. AC 65-15A	7193. AC 65-9A	7246. AC 65-9A	7297. AC 65-9A
7142. AC 65-9A	7194. AC 65-9A	E03:	7298. AC 65-9A
7143. AC 65-9A	7195. AC 65-9A	7247. AC 65-9A	7299. AC 65-9A
C01:	7196. AC 65-9A	7248. AC 65-9A	7300. AC 65-9A
7144. AC 65-9A	7197. AC 43.13-1A	7249. AC 65-9A	7301. AC 65-9A
7145. AC 65-9A	7198. AC 43.13-1A	7250. AC 65-9A	7302. AC 65-9A
7146. AC 65-9A	7199. AC 65-9A	7251. AC 65-9A	7303. AC 65-9A
7147. AC 65-9A	7200. AC 65-9A	7252. AC 65-9A	7304. AC 65-9A
7148. AC 65-9A	7201. AC 65-9A	7253. AC 65-9A	7305. AC 65-9A
7149. AC 65-9A	7202. AC 65-9A	7254. AC 65-9A	7306. EA-ITP-GB
7150. AC 65-9A	7203. AC 65-9A	7255. AC 65-9A	7307. AP
7151. AC 65-9A	7204. EA-ITP-GB	7256. AC 43.13-1A	7308. AP
7152. AC 65-9A	7205. AC 65-9A	7257. AC 65-9A	7309. AP
7153. AC 65-9A	7206. AC 65-9A	7258. AC 65-9A	7310. AP
7154. AC 65-9A	7207. AC 65-9A	7259. AC 65-9A	7311. AP
7155. AC 65-9A	7208. EA-ITP-GB	7260. AC 65-9A	7312. AP
7156. AC 65-9A	7209. AC 65-9A	7261. AC 65-9A	7313. EA-ITP-P
7157. AC 65-9A	7210. AC 65-9A	E04:	7314. AP
7158. AC 65-9A	7211. AC 65-9A	7262. AC 65-9A	F01:
7159. AC 65-9A	7212. AC 65-9A	7263. AC 65-15A	7315. AC 65-9A
7160. AC 65-9A	7213. AC 65-9A	7264. AC 65-9A	7316. AC 65-9A
7161. AC 65-9A	7214. AC 65-9A	7265. AC 65-9A	7317. AC 65-9A
7162. AC 65-9A	7215. AC 65-9A	7266. AC 43.13-1A	7318. AC 65-9A
7163. AC 65-9A	E01:	7267. AC 65-9A	7319. AC 65-9A
C02:	7216. AC 65-9A	7268. AC 43.13-1A	7320. AC 65-9A
7164. AC 43.13-1A	7217. AC 65-9A	7269. AC 65-9A	7321. AC 65-9A
7165. FAR 23.29	7218. AC 65-9A	7270. AC 43.13-1A	7322. AC 65-9A
7166. AC 65-9A	7219. AC 43-3	7271. AC 43.13-1A	7323. AC 65-9A
7167. AC 65-9A	7220. AC 43-3	7272. AC 43.13-1A	7324. AC 65-9A
7168. AC 65-9A	7221. AC 65-9A	7273. AC 65-9A	7325. AC 65-9A
7169. AC 65-9A	7222. AC 65-9A	7274. AC 43.13-1A	7326. AC 65-9A
7170. FAR 23.29	7223. AC 65-9A	7275. AC 65-9A	7327. AP
7171. AC 65-9A	7224. EA-ITP-GB	7276. AC 65-9A	7328. AC 65-9A
7172. AC 65-9A	7225. AC 65-9A	7277. AC 65-9A	7329. AC 65-9A
7173. AC 65-9A	7226. AC 65-15A	7278. AC 43.13-1A	7330. AC 65-9A
7174. AC 65-9A	E02:	7279. AC 65-9A	7331. AC 65-9A
7175. AC 65-9A	7227. AC 65-9A	7280. AC 65-9A	7332. AC 65-9A
7176. AC 65-9A	7228. AC 65-9A	7281. AC 65-9A	7333. AC 65-9A
7177. AC 65-9A	7229. EA-ITP-GB	7282. AC 65-9A	7334. AC 65-9A
7178. AC 65-9A	7230. AC 65-9A	7283. AC 65-9A	7335. AC 65-9A
7179. AC 43.13-1A	7231. AC 65-9A	E05:	7336. AC 65-9A
7180. AC 43.13-1A	7232. AC 65-9A	7284. AC 65-9A	7337. AC 65-9A
7181. AC 65-9A	7233. AC 65-9A	7285. AC 65-9A	F02:
7182. AC 65-9A	7234. AC 65-9A	7286. AC 65-15A	7338. AC 65-9A
7183. AC 65-9A	7235. AC 65-9A	7287. AC 43.13-1A	7339. AC 65-9A



7340.	AC 65-9A	7392.	AC 65-9A	7444.	AC 65-9A	7495.	FAR 21.179
7341.	AC 65-9A	7393.	AC 65-9A	101:		7496.	AC 65-9A
7342.	AC 65-9A	7394.	AC 65-9A	7445.	AC 65-9A	7497.	FAR 21
7343.	AC 65-9A	7395.	AC 65-9A	7447.	AC 65-9A	7498.	FAR 21
7344.	AC 65-9A	H02:		7448.	FAR 43.11	7499.	EA-ITP-GB
7345.	AC 65-9A	7396.	AC 65-12A	7449.	AC 65-9A	7500.	EA-ITP-GB
7346.	AC 65-9A	7397.	AC 65-9A	7450.	FAR 43 APP A	7501.	FAR 43.11(b)
7347.	AC 65-9A	7398.	AC 65-9A	7451.	AC 65-19E	7502.	EA-ITP-GB
7348.	AC 65-9A	7399.	AC 65-9A	7452.	FAR 43	7503.	FAR 43.13
7349.	AC 65-9A	7400.	AC 65-9A	7453.	AC 65-9A	7504.	FAR 23.1543
G01:		7401.	AC 65-9A	7454.	AC 43.13-1A	7505.	FAR 39.1
7350.	AC 65-12A	7402.	AC 65-9A	7455.	AC 43.13-1A	7506.	AC 65-19E
7351.	AC 65-12A	7403.	AC 65-9A	7456.	AC 43.13-1A	7507.	AC 65-19E
7352.	AC 65-9A	7404.	AC 65-9A	102:		7508.	AC 65-19E
7353.	AC 65-9A	7405.	AC 65-9A	7446.	FAR 43.11	7509.	AC 65-9A
7354.	AC 65-9A	7406.	AC 65-9A	7457.	FAR 43.11	7510.	ABS
7355.	AC 65-9A	7407.	AC 65-9A	7458.	FAR 43.3(b)	K02:	
7356.	AC 65-9A	7408.	AC 65-9A	7459.	FAR 43.9	7511.	FAR 39
7357.	AC 65-9A	7409.	AC 65-9A	7460.	AC 65-9A	7512.	FAR 43.13
7358.	AC 65-9A	7410.	AC 65-12A	7461.	FAR 43	7513.	FAR 43.13
7359.	AC 65-9A	H03:		7462.	FAR 91.417	7514.	FAR 43.13
G02:		7411.	AC 65-9A	7463.	FAR 43.15(c)	7515.	FAR 23.1545
7360.	EA-ITP-GB	7412.	AC 65-9A	7464.	FAR 43	7516.	FAR 43.13
7361.	AC 65-9A	7413.	AC 65-12A	7465.	FAR 43.9	7517.	FAR 43.13
7362.	AC 65-9A	7414.	AC 65-9A	7466.	FAR 43.7	L01:	
7363.	AC 65-9A	7415.	AC 65-9A	J01:		7518.	FAR 65.81
7364.	AC 65-9A	7416.	AC 65-9A	7467.	AC 65-9A	7519.	FAR 65.85
7365.	AC 65-9A	7417.	AC 65-9A	7468.	AC 65-9A	7520.	FAR 43
7366.	AC 65-9A	7418.	AC 65-9A	7469.	AC 65-9A	7521.	FAR 43
7367.	AC 65-9A	7419.	AC 65-9A	7470.	AC 65-9A	7522.	FAR 43
7368.	AC 65-9A	7420.	AC 65-9A	7471.	AC 65-9A	7523.	FAR 65.87
7369.	AC 65-9A	7421.	AC 65-9A	7472.	AC 65-9A	7524.	FAR 65.81
7370.	AC 43.13-1A	7422.	AC 65-9A	7473.	AC 65-9A	7525.	FAR 65.81
7371.	AC 65-9A	7423.	AC 65-9A	7474.	AC 65-9A	7526.	FAR 65.81(a)
7372.	AC 65-9A	7424.	AC 65-9A	7475.	AC 65-9A	7527.	FAR 43 APP A
7373.	AC 65-12A	7425.	AC 65-9A	7476.	AC 65-9A	7528.	FAR 65.81
7374.	AC 65-9A	7426.	AC 65-9A	7477.	ABS	7529.	FAR 65.87
7375.	AC 65-9A	7427.	AC 65-9A	7478.	AC 65-9A	7530.	FAR 65
7376.	AC 65-9A	7428.	AC 65-9A	7479.	AC 65-9A	7531.	FAR 65.83
7377.	AC 65-9A	7429.	AC 65-9A	7480.	AC 65-9A	7532.	FAR 65.81
7378.	AC 65-9A	7430.	AC 65-9A	7481.	AC 65-9A	7533.	FAR 43.13(6)
7379.	AC 43.13-1A	7431.	AC 65-9A	7482.	AC 65-9A	7534.	AC 43.13-1A
7380.	AC 65-9A	7432.	AC 65-9A	7483.	AC 65-9A	7535.	FAR 43
H01:		7433.	AC 65-9A	7484.	AC 65-9A	7536.	FAR 65.87
7381.	AC 65-9A	H04:		7485.	EA-ITP-GB	7537.	AC 43.13-1A
7382.	AC 65-9A	7434.	AC 65-9A	7486.	AC 65-9A		
7383.	AC 65-9A	7435.	AC 65-9A	7487.	AC 65-9A		
7384.	AC 65-9A	7436.	AC 65-9A	7488.	AC 65-9A		
7385.	AC 65-9A	7437.	AC 65-9A	K01:			
7386.	AC 65-9A	7438.	AC 65-9A	7489.	FAR 39		
7387.	AC 65-9A	7439.	AC 65-9A	7490.	FAR 21		
7388.	AC 65-9A	7440.	AC 65-9A	7491.	FAR 21		
7389.	AC 65-9A	7441.	AC 65-9A	7492.	FAR 39		
7390.	AC 65-9A	7442.	AC 65-9A	7493.	AC 65-9A		
7391.	AC 65-9A	7443.	AC 65-9A	7494.	EA-ITP-GB		





## **APPENDIX 2**





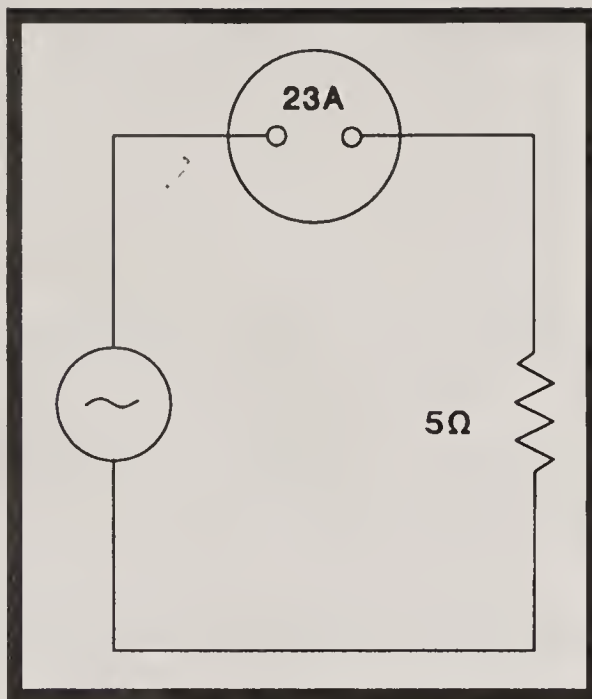


FIGURE 1.—Circuit Diagram.

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

**Z** = Impedance  
**R** = Resistance  
**X<sub>L</sub>** = Inductive Reactance  
**X<sub>C</sub>** = Capacitive Reactance

FIGURE 2.—Formula.

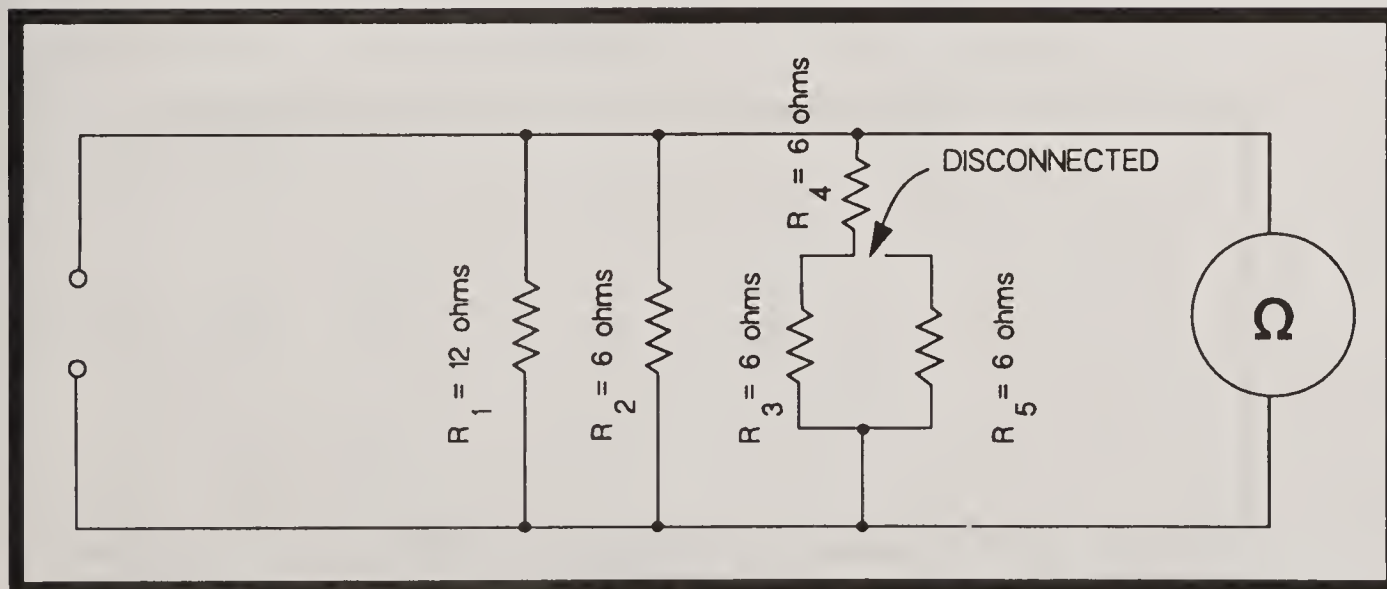


FIGURE 3.—Circuit Diagram.

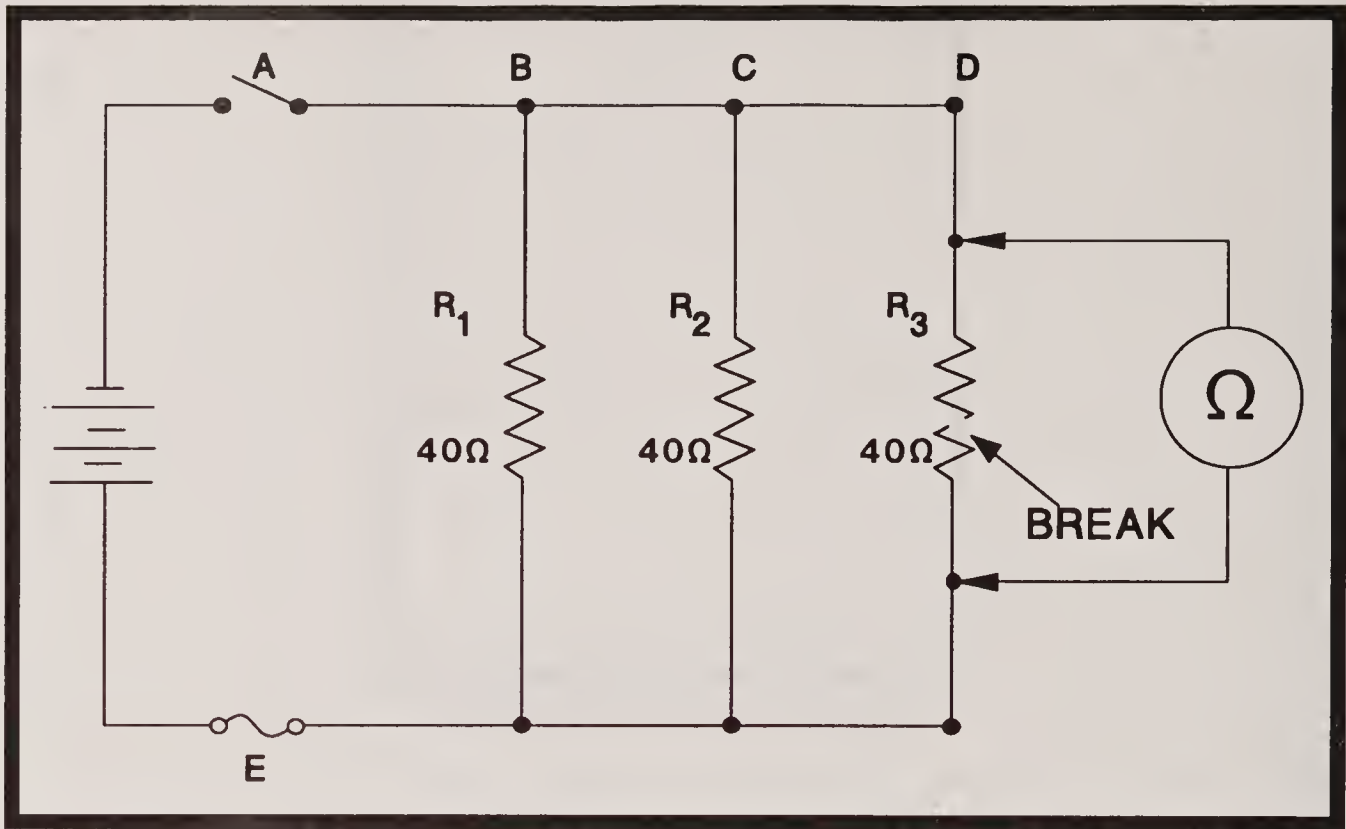


FIGURE 4.—Circuit Diagram.

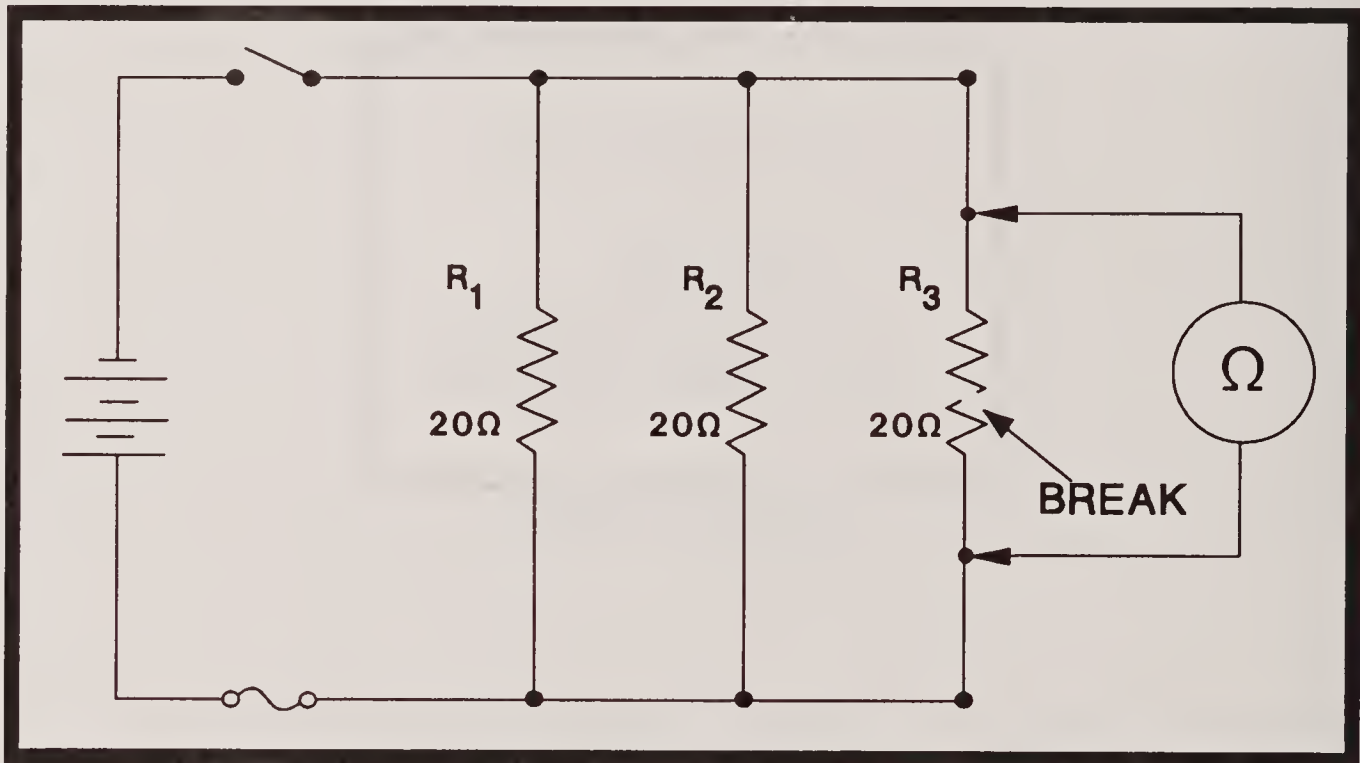


FIGURE 5.—Circuit Diagram.

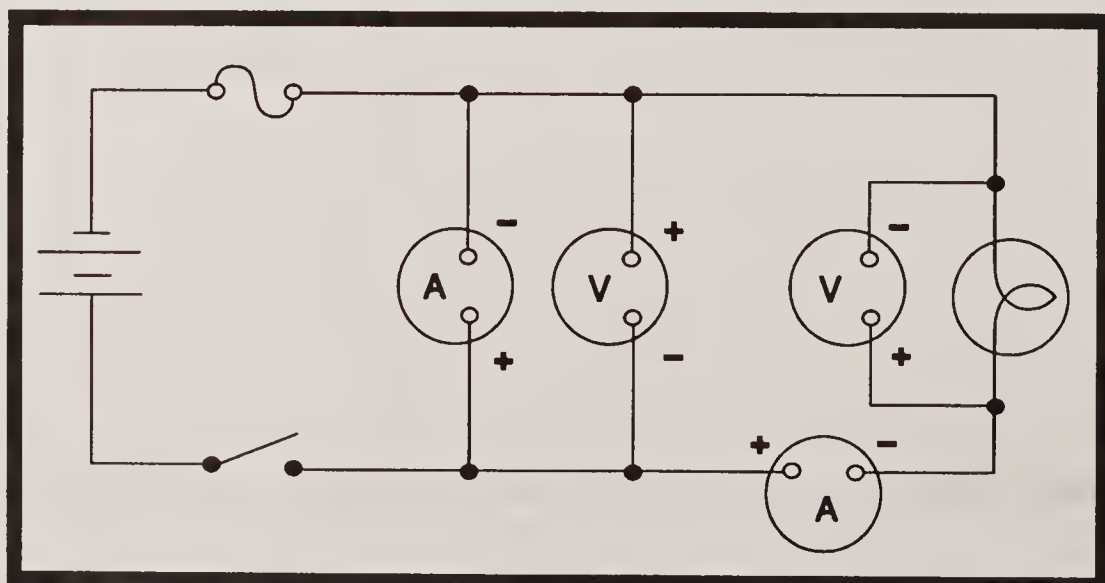


FIGURE 6.—Circuit Diagram.



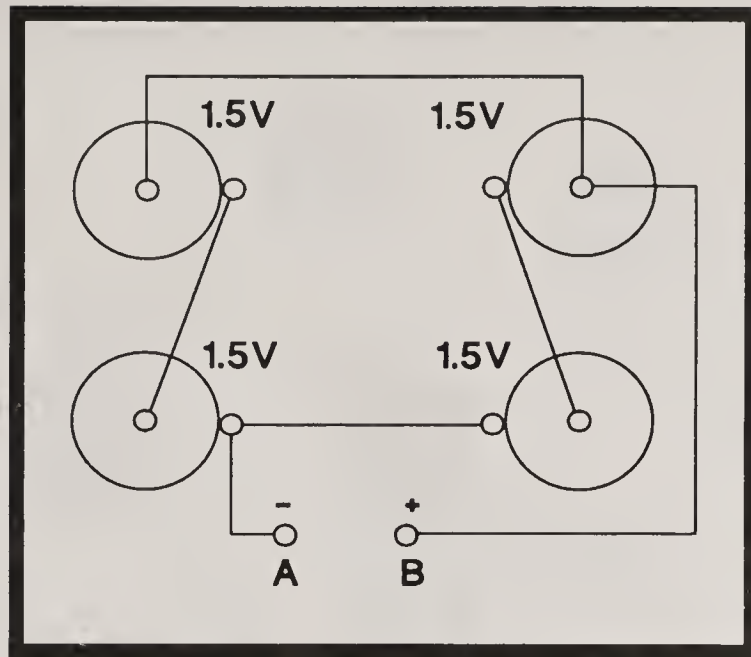


FIGURE 7.—Battery Circuit.

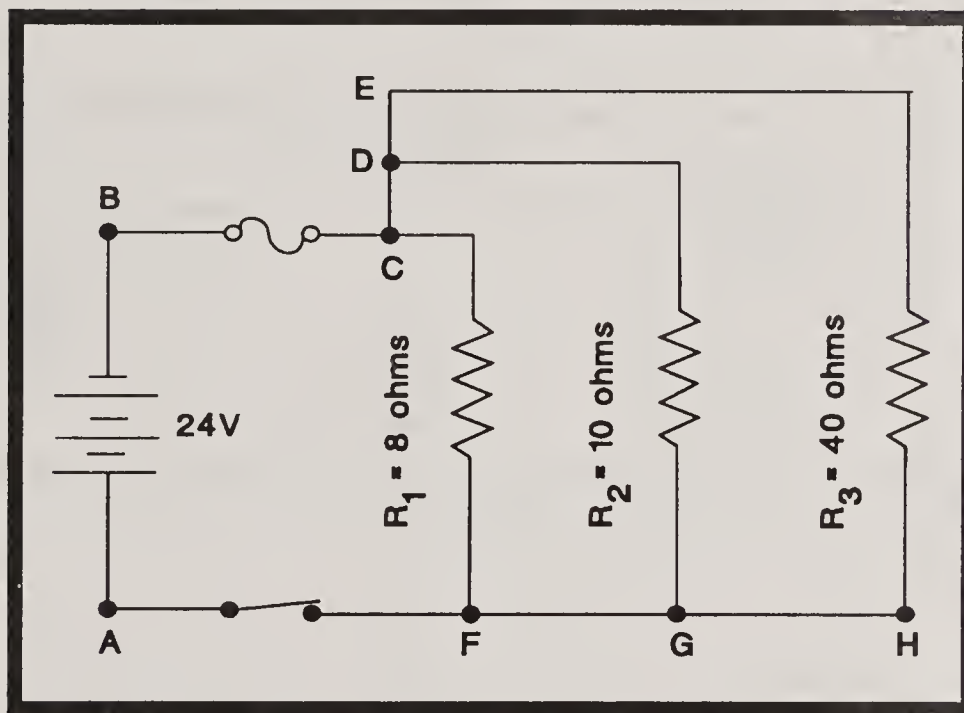


FIGURE 8.—Circuit Diagram.

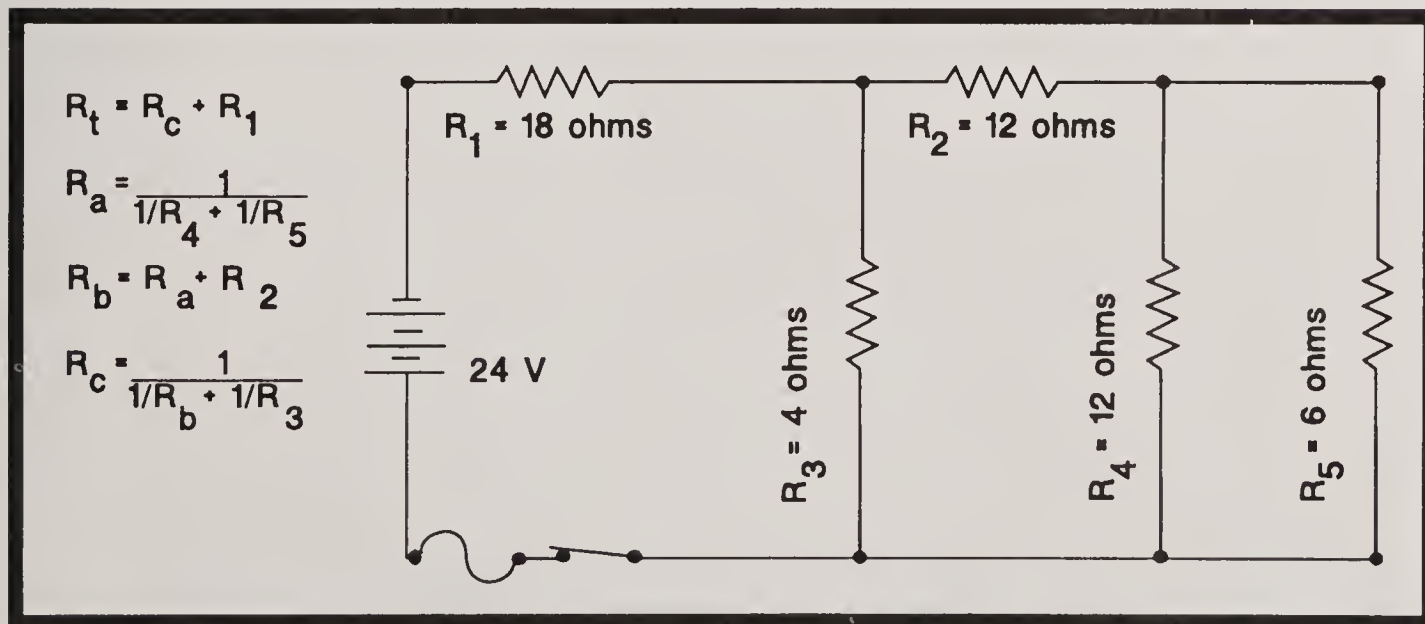


FIGURE 9.—Circuit Diagram.

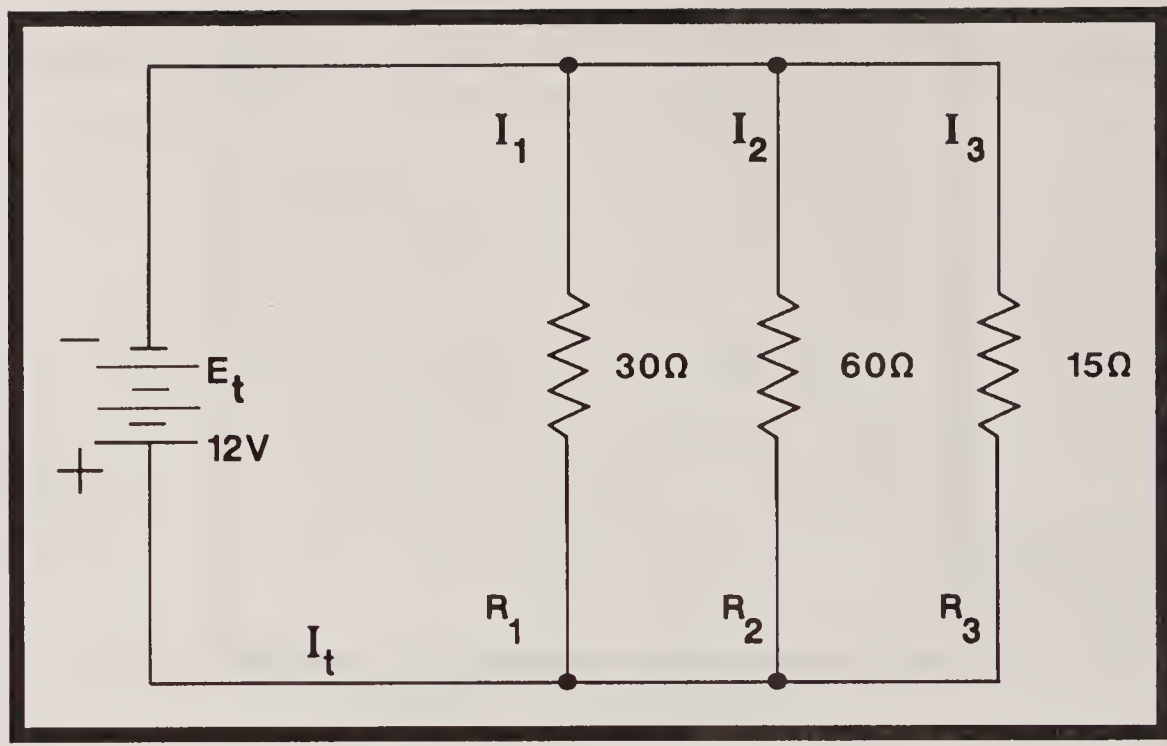


FIGURE 10.—Circuit Diagram.

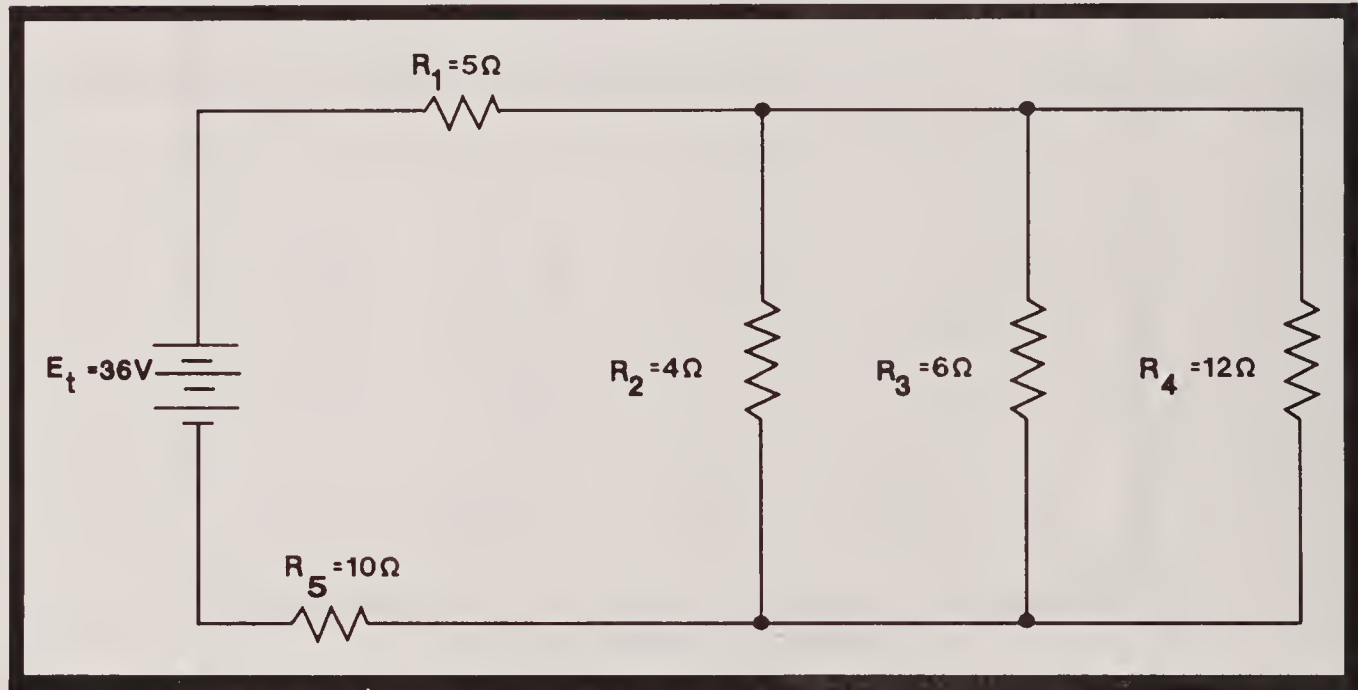


FIGURE 11.—Circuit Diagram.

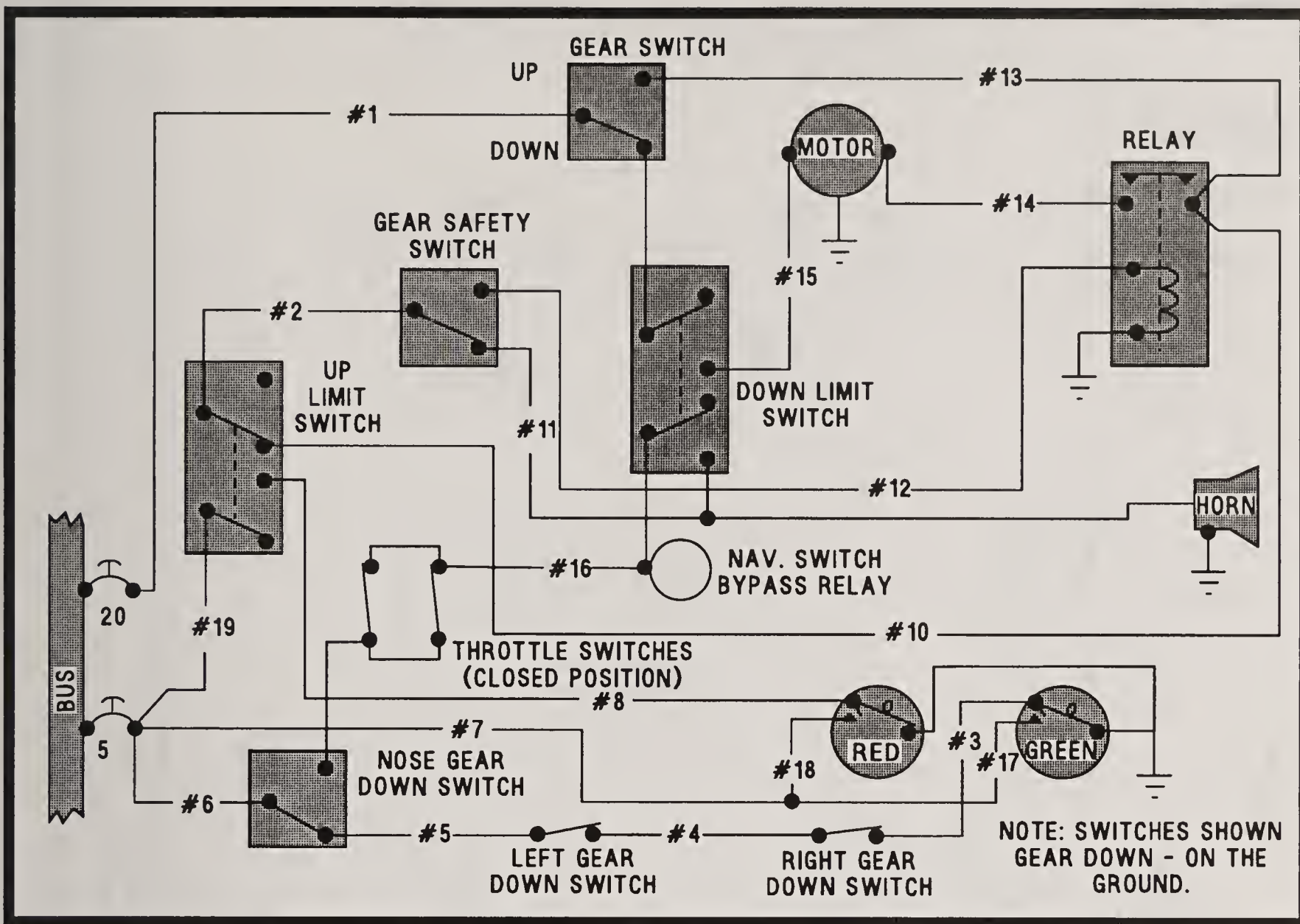


FIGURE 12.—Landing Gear Circuit.



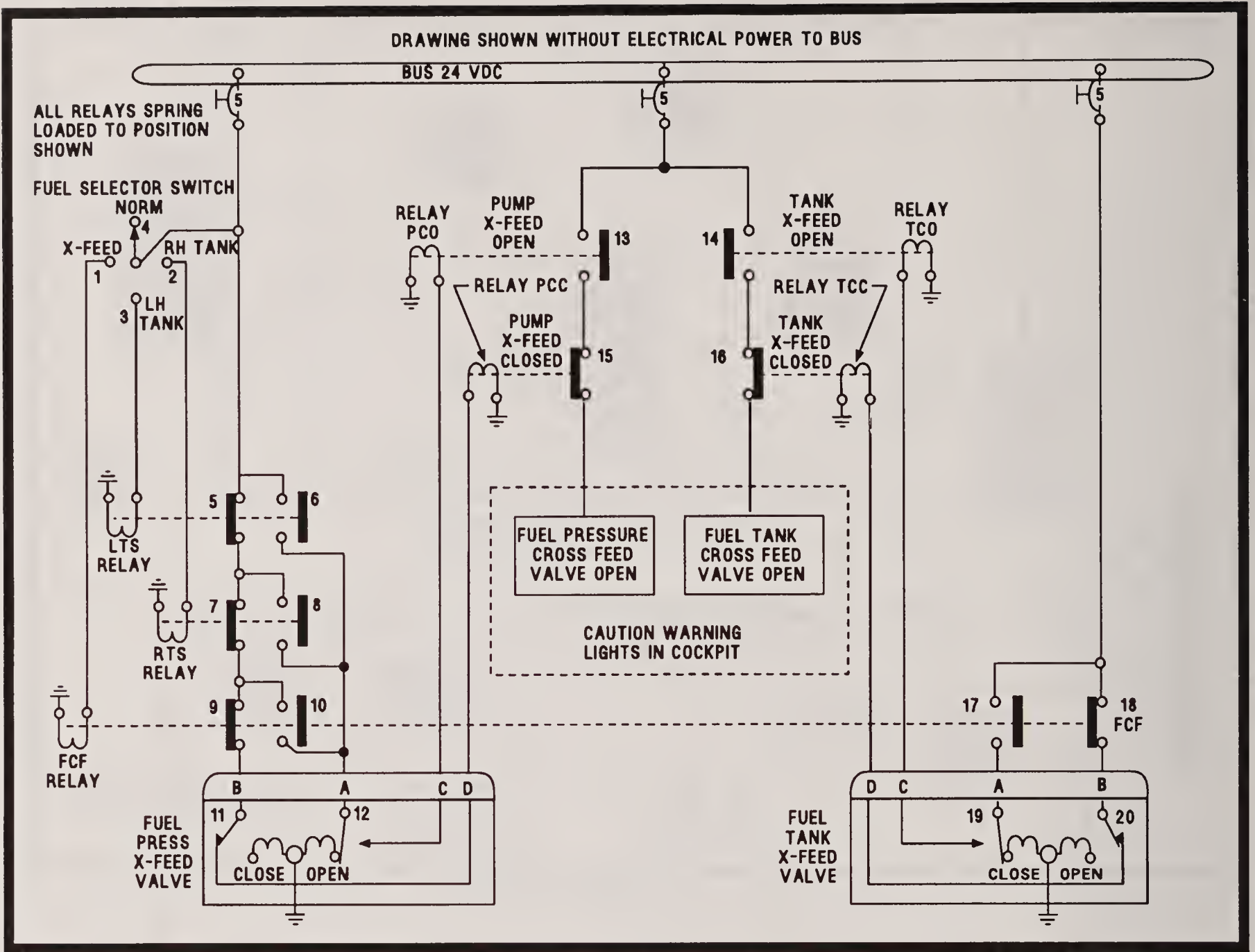


FIGURE 13.—Fuel System Circuit.

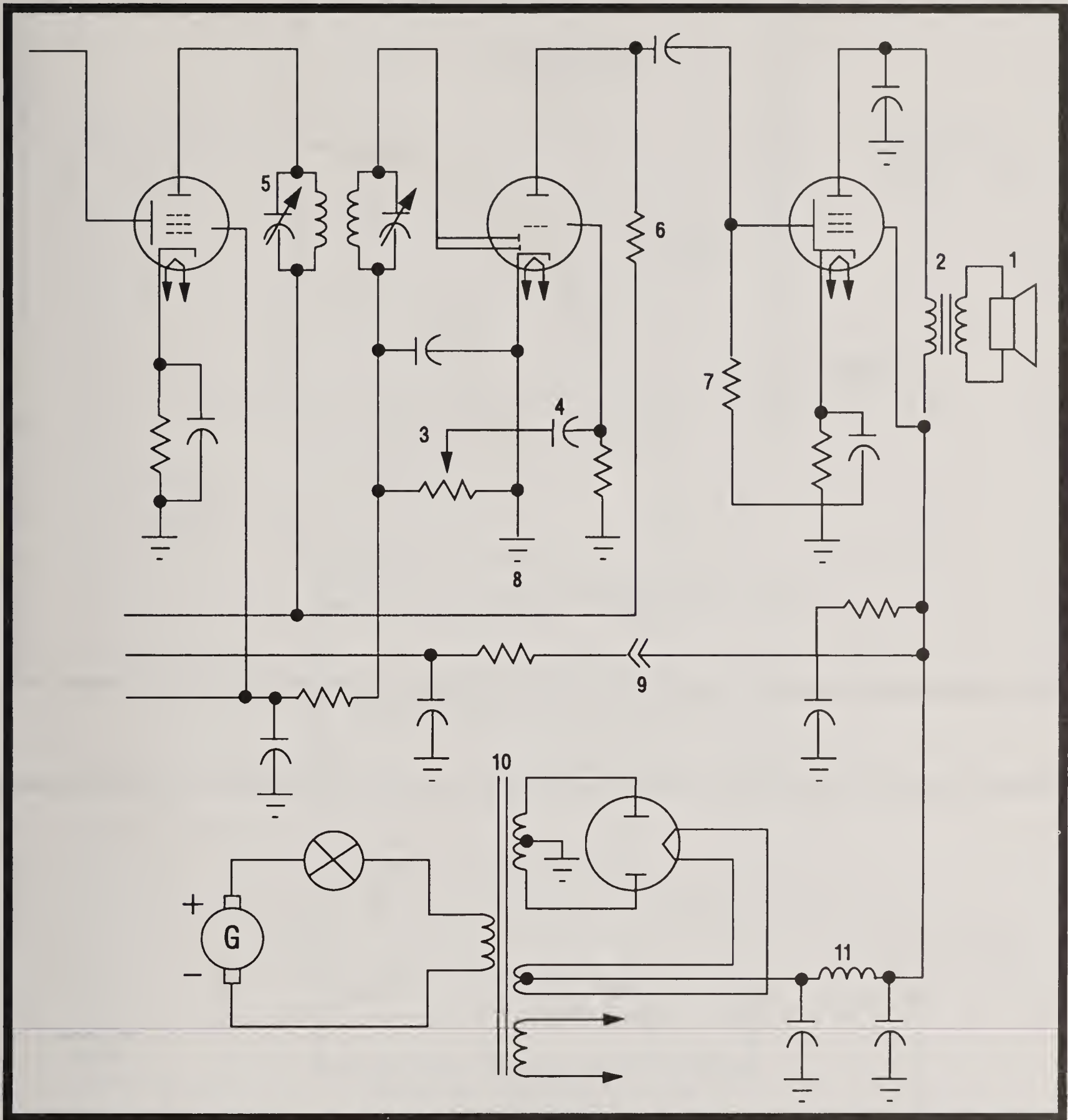


FIGURE 14.—Electrical Symbols.

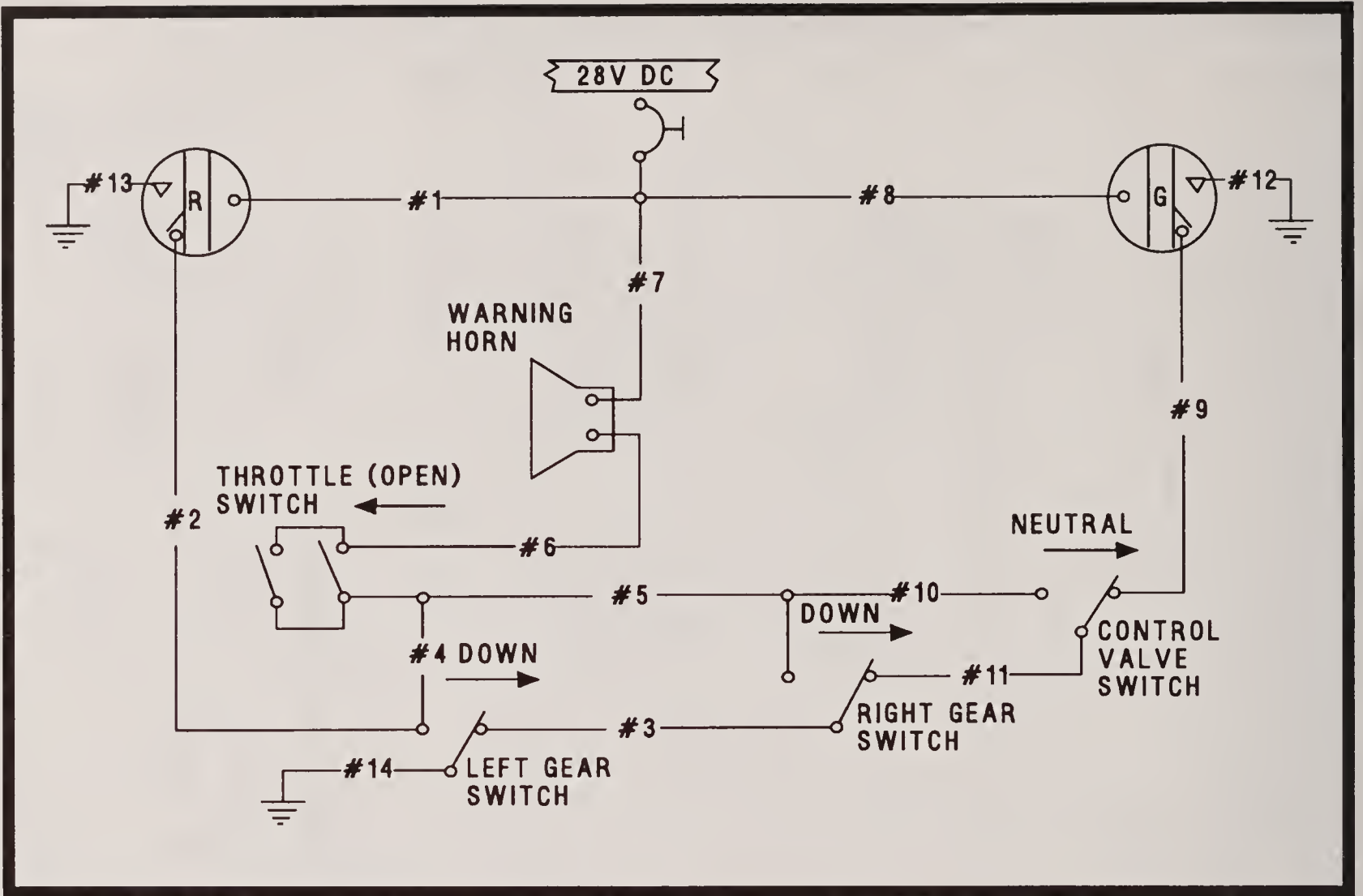


FIGURE 15.—Landing Gear Circuit.

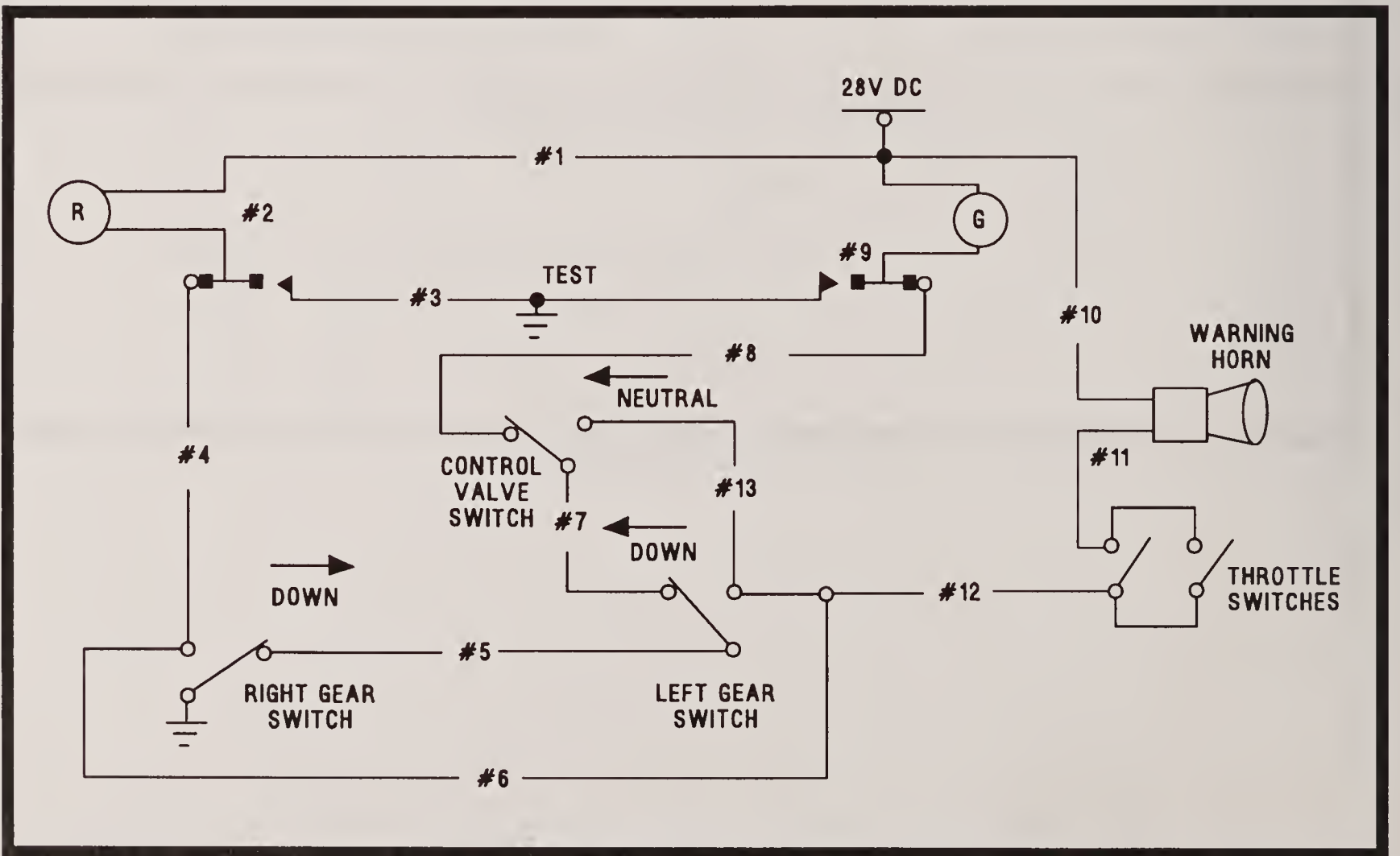


FIGURE 16.—Landing Gear Circuit.



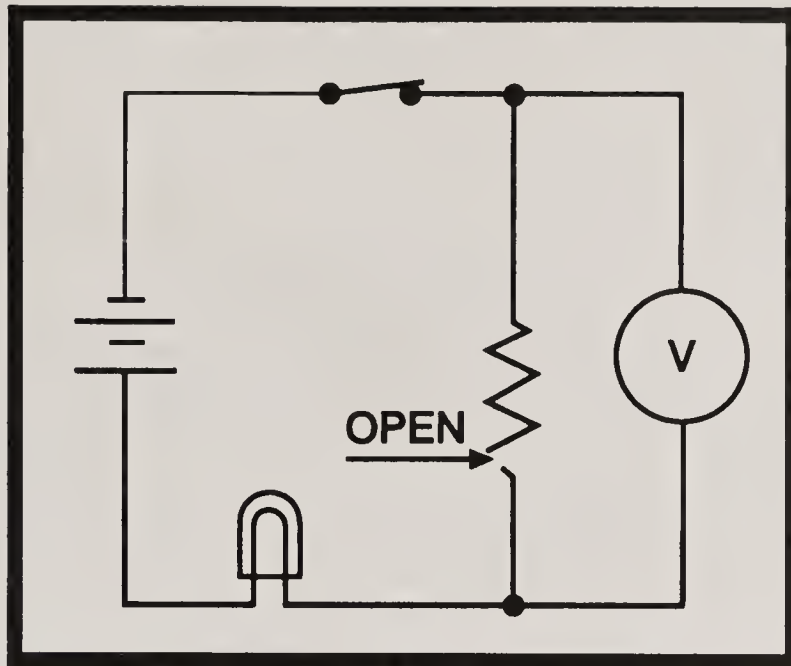


FIGURE 17.—Circuit Diagram.

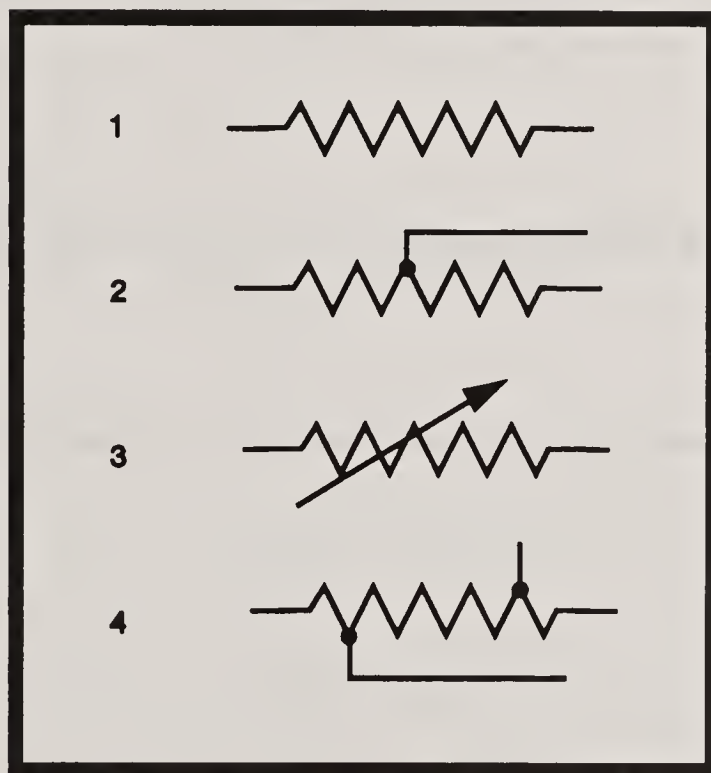


FIGURE 18.—Electrical Symbols.

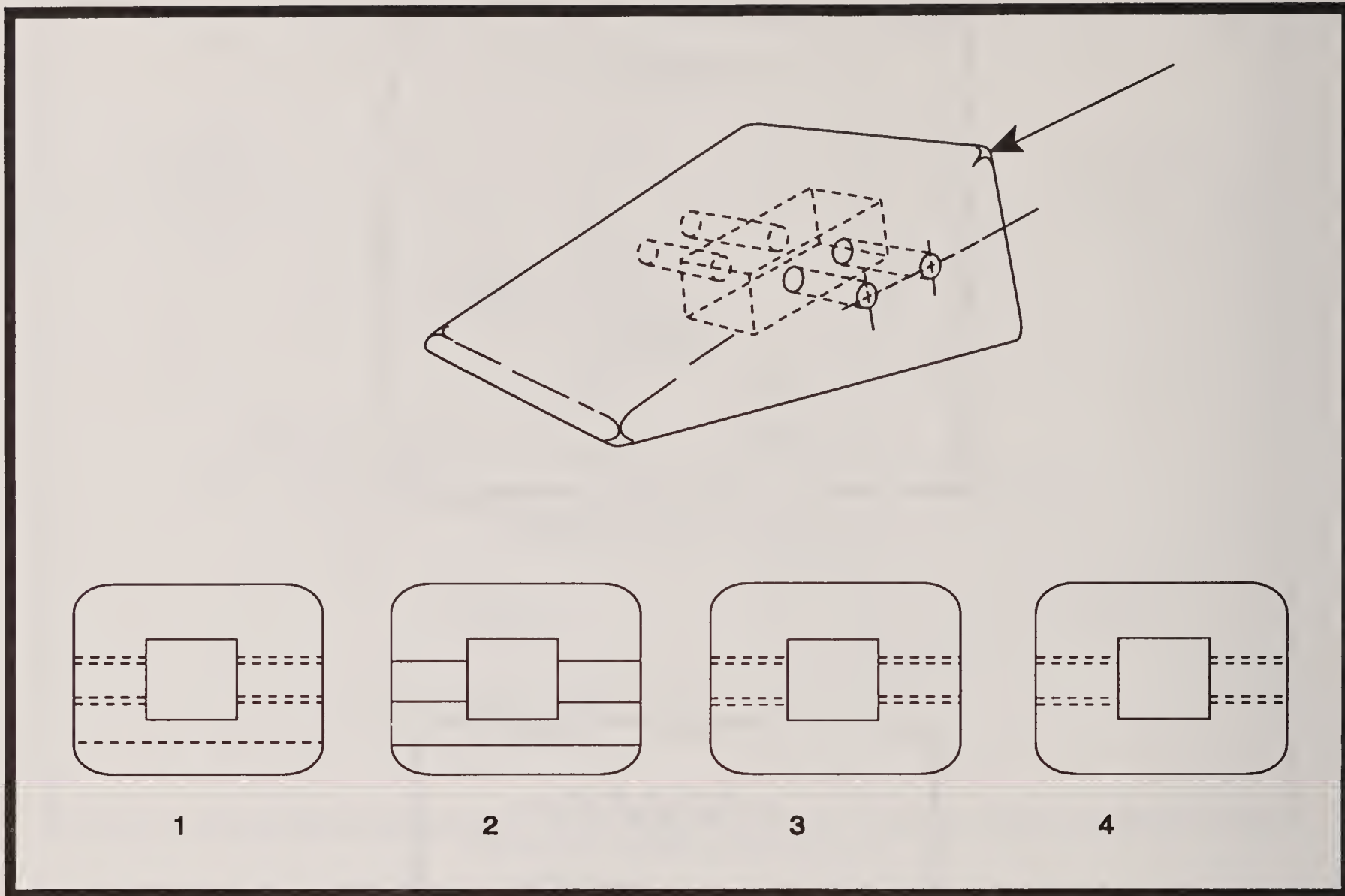


FIGURE 19.—Object Views.

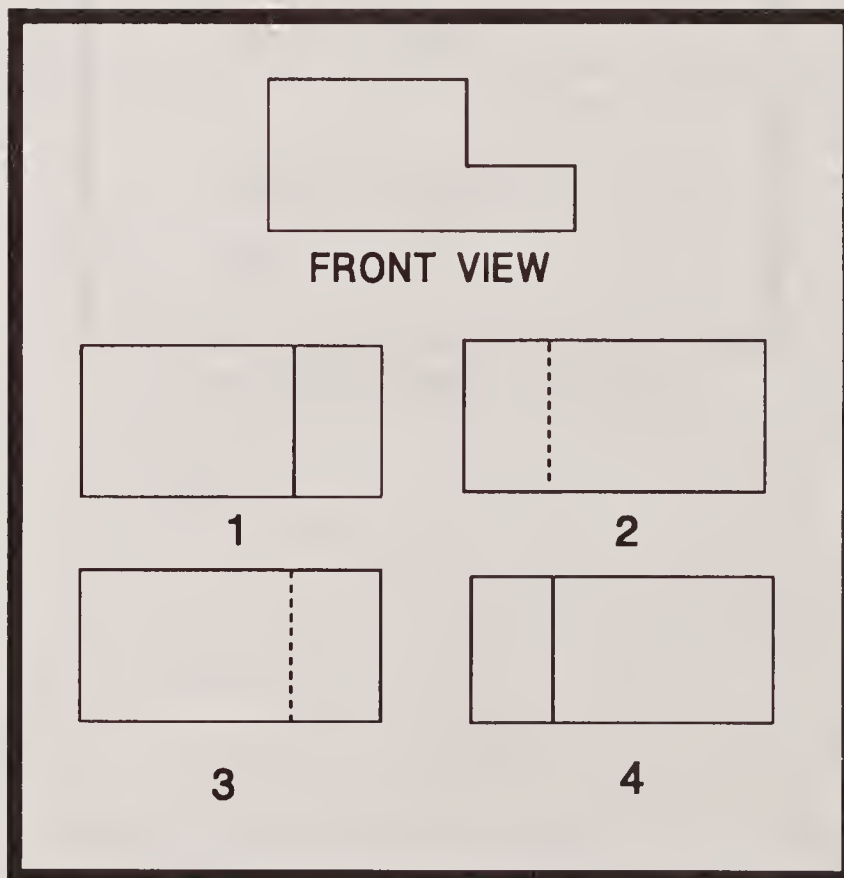


FIGURE 20.—Object Views.

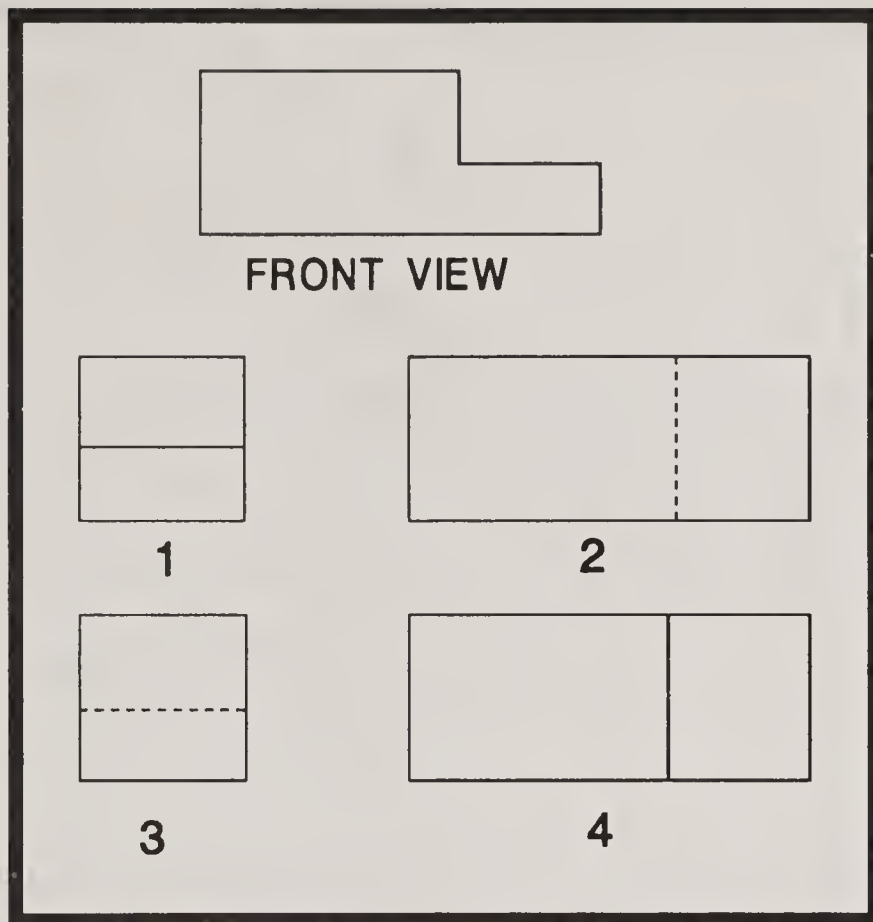


FIGURE 21.—Object Views.

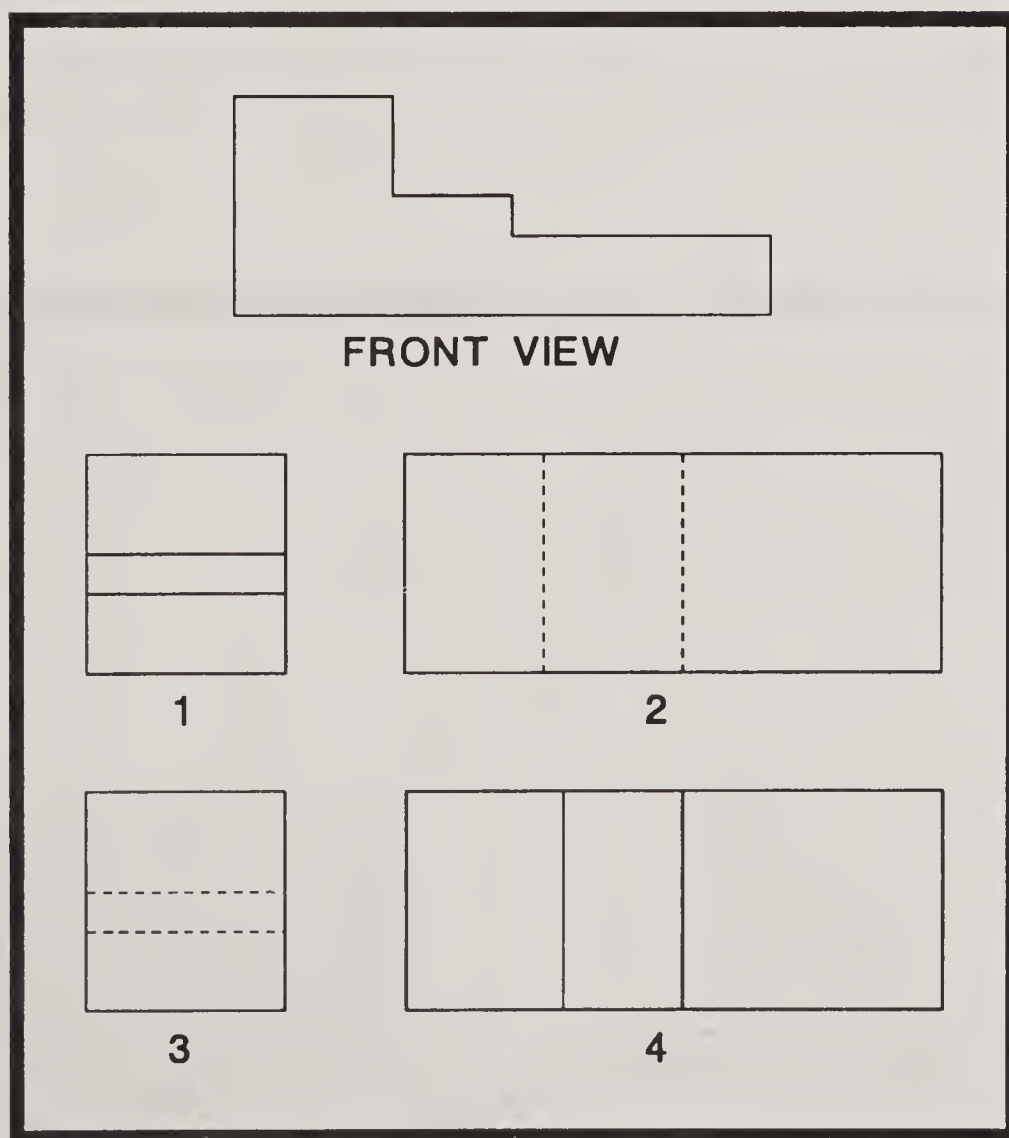


FIGURE 22.—Object Views.



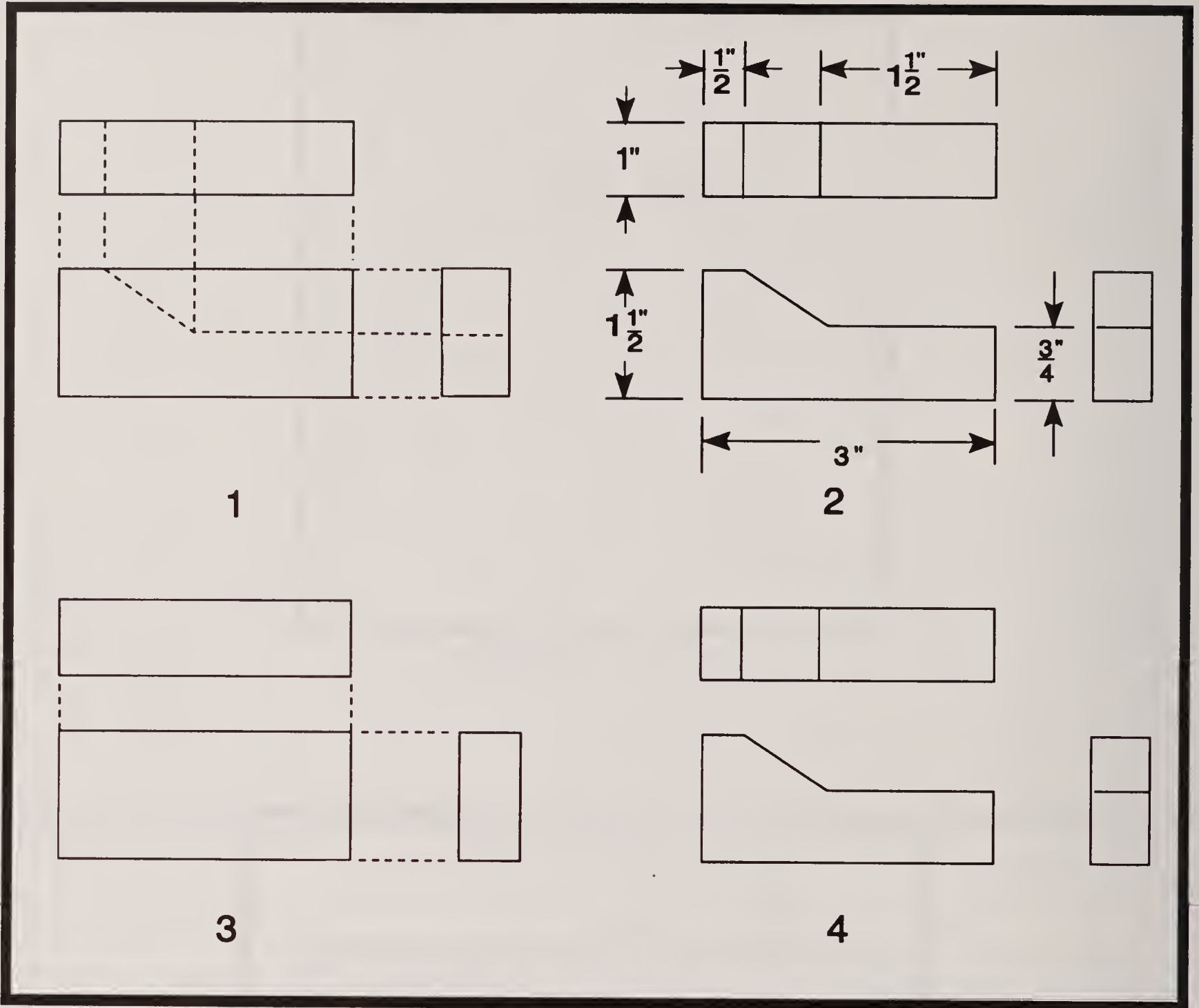


FIGURE 23.—Sketches.

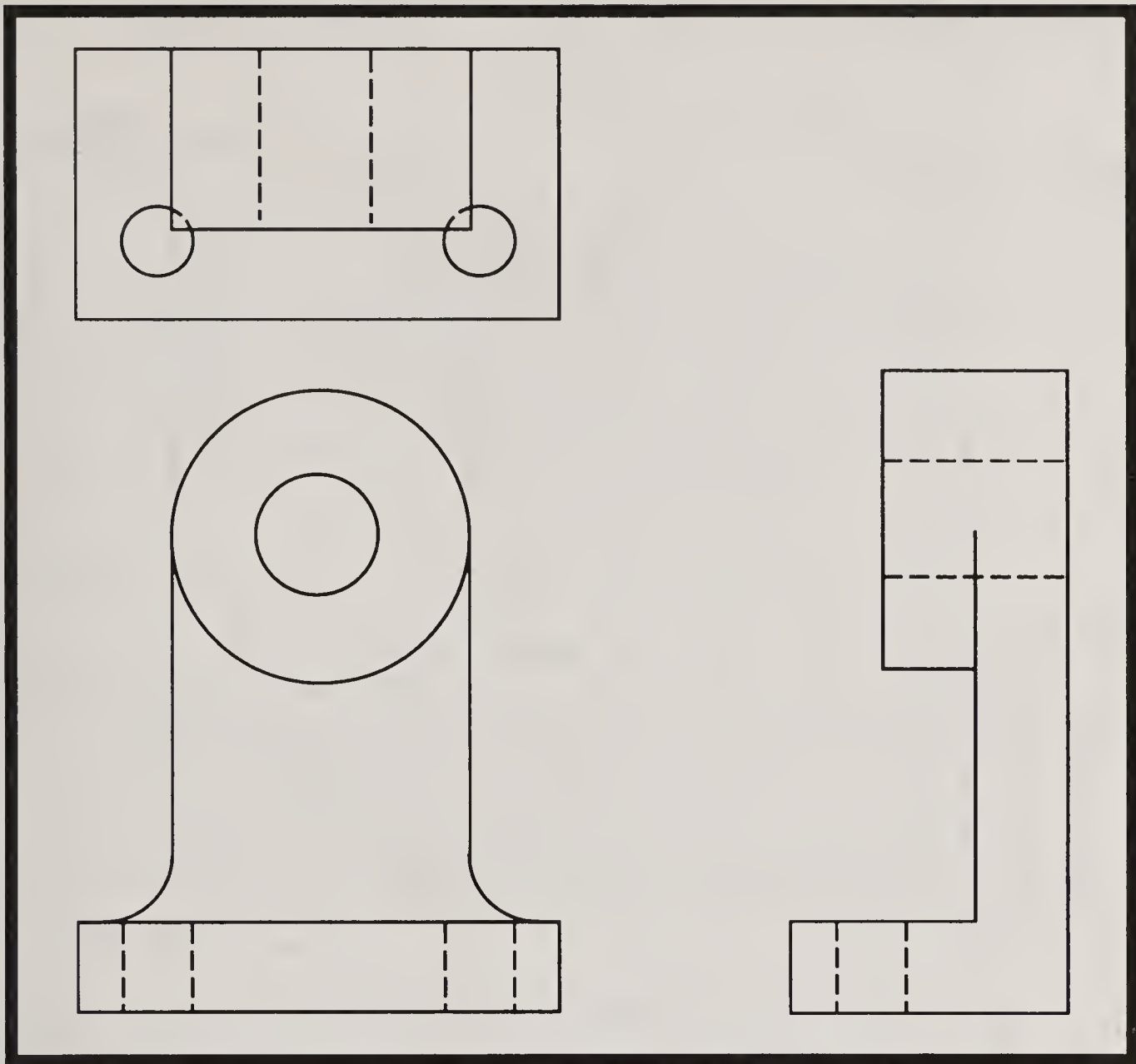


FIGURE 24.—Sketches.

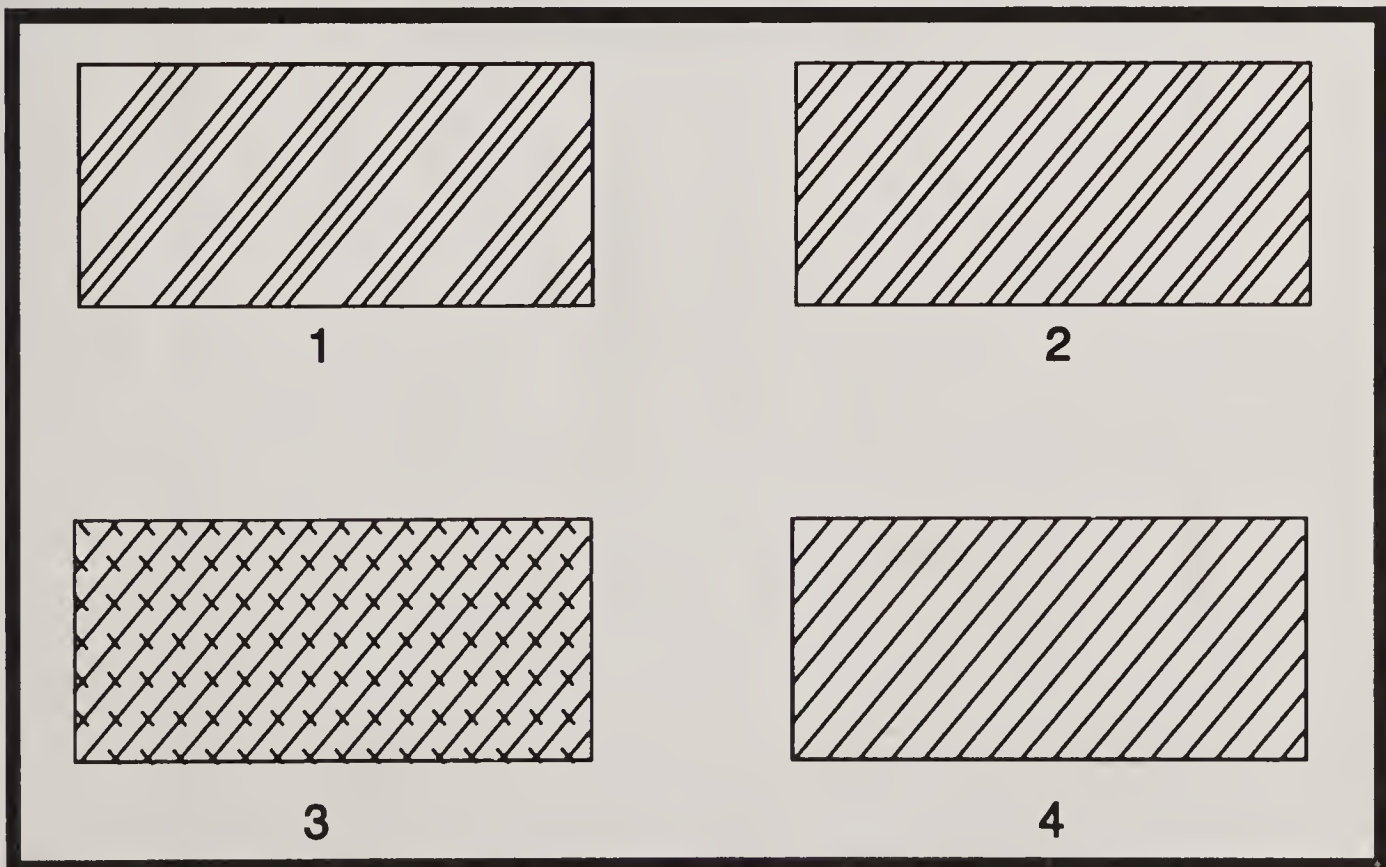


FIGURE 25.—Material Symbols.

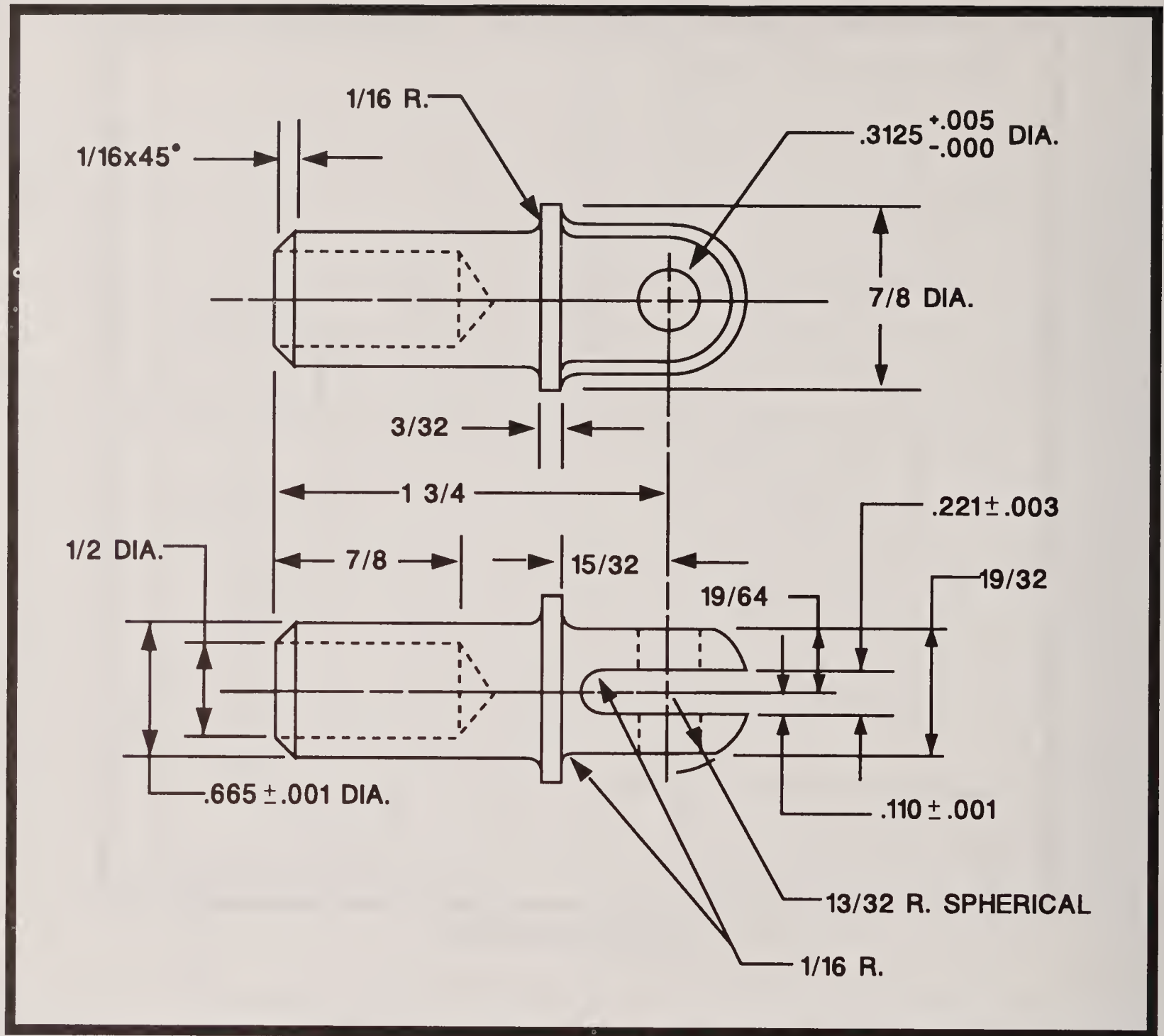


FIGURE 26.—Aircraft Drawing.



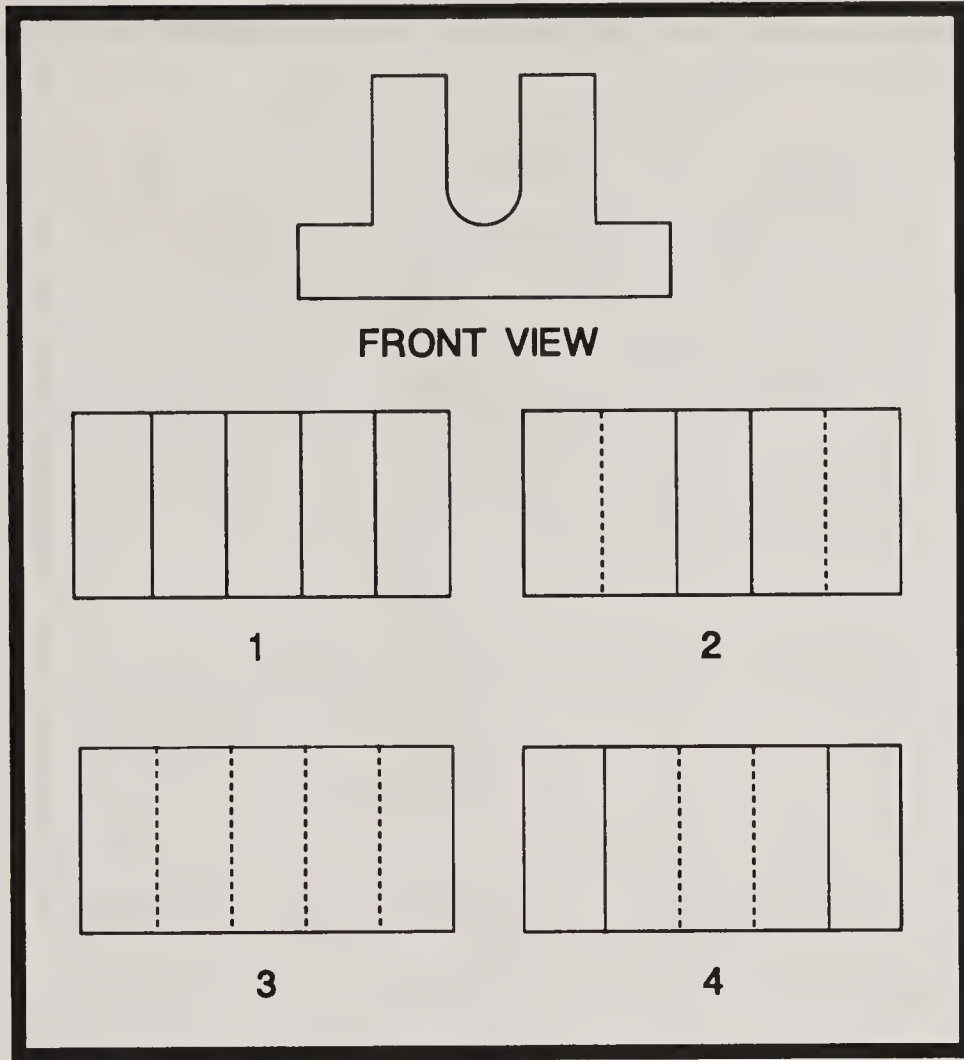


FIGURE 27.—Object Views.

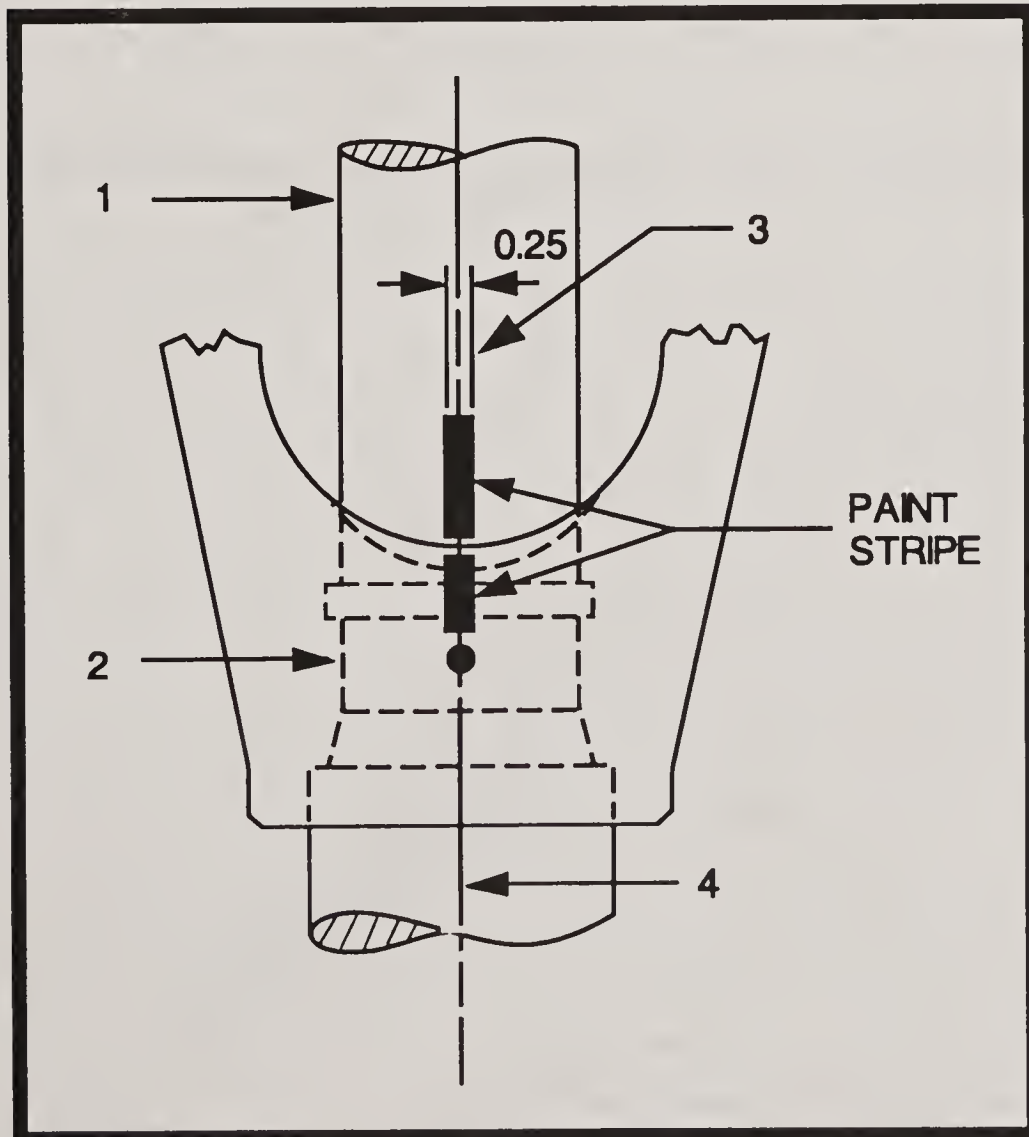


FIGURE 28.—Aircraft Drawing.

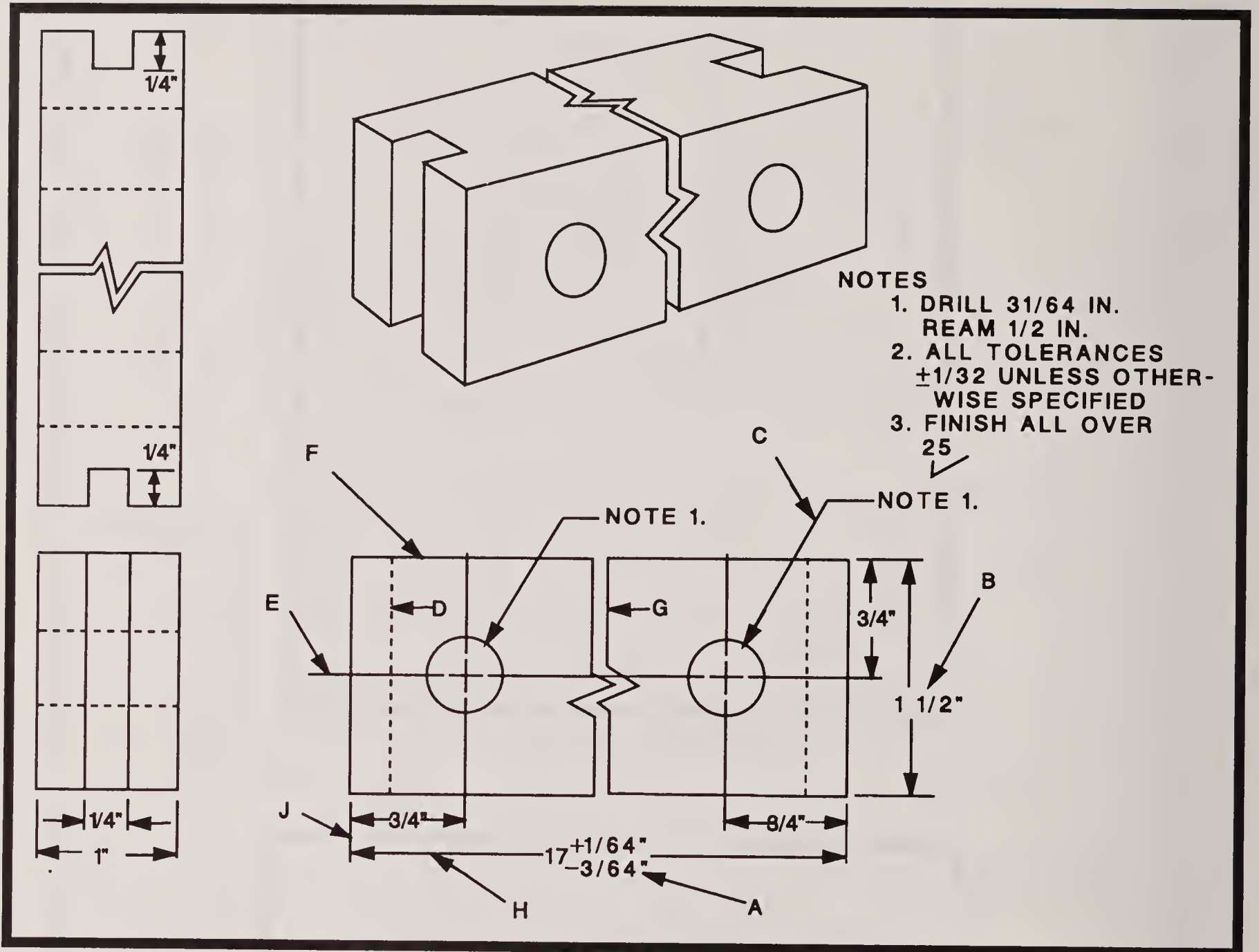


FIGURE 29.—Aircraft Drawing.

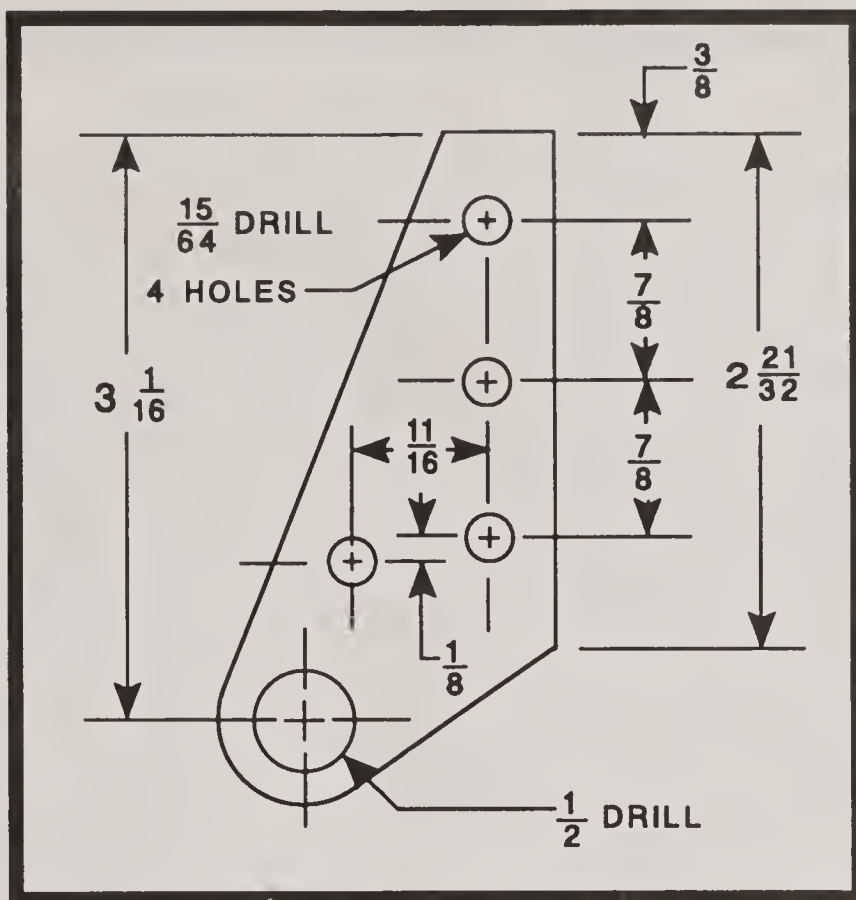


FIGURE 30.—Aircraft Drawing.

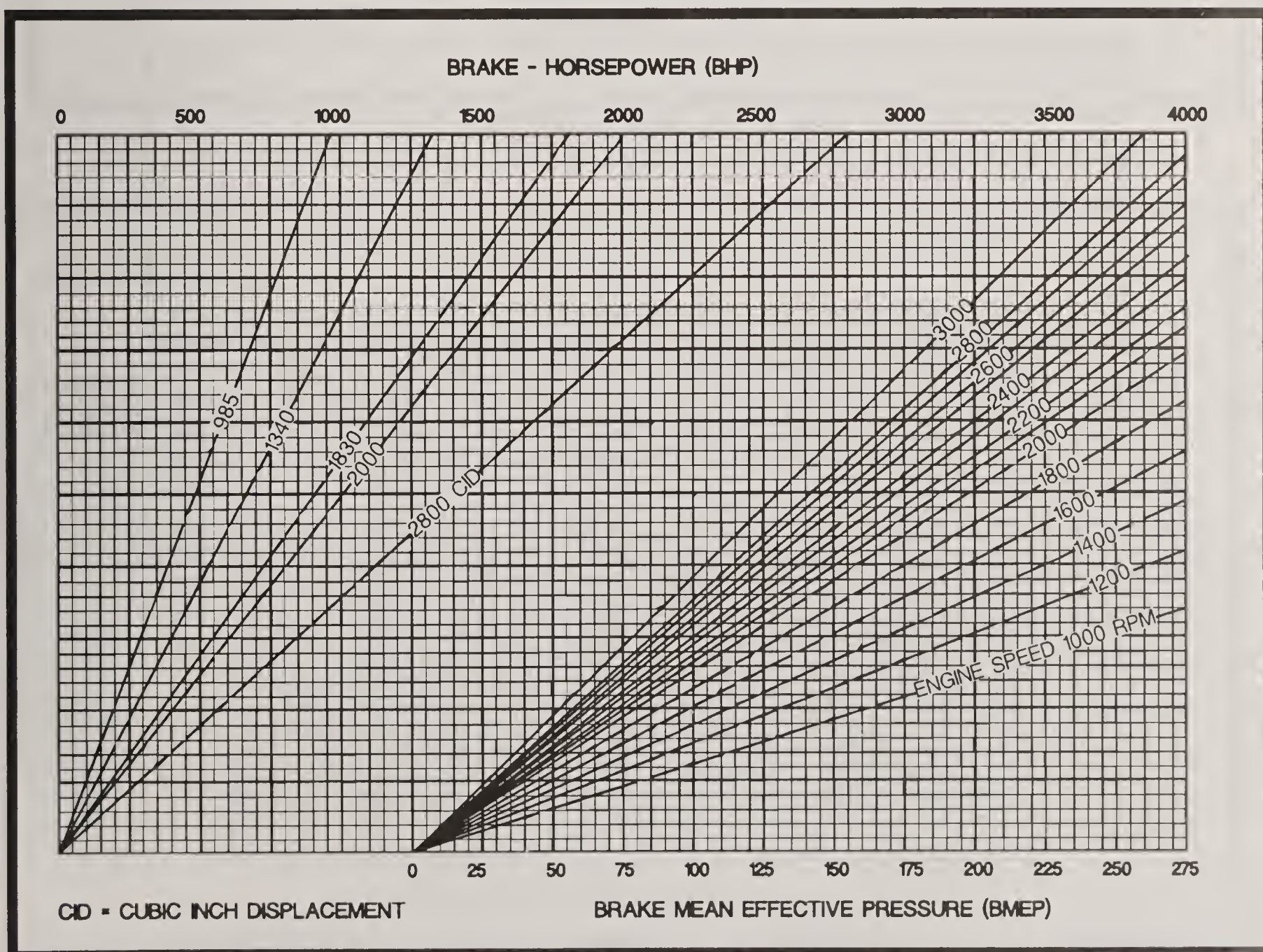


FIGURE 31.—Performance Chart.



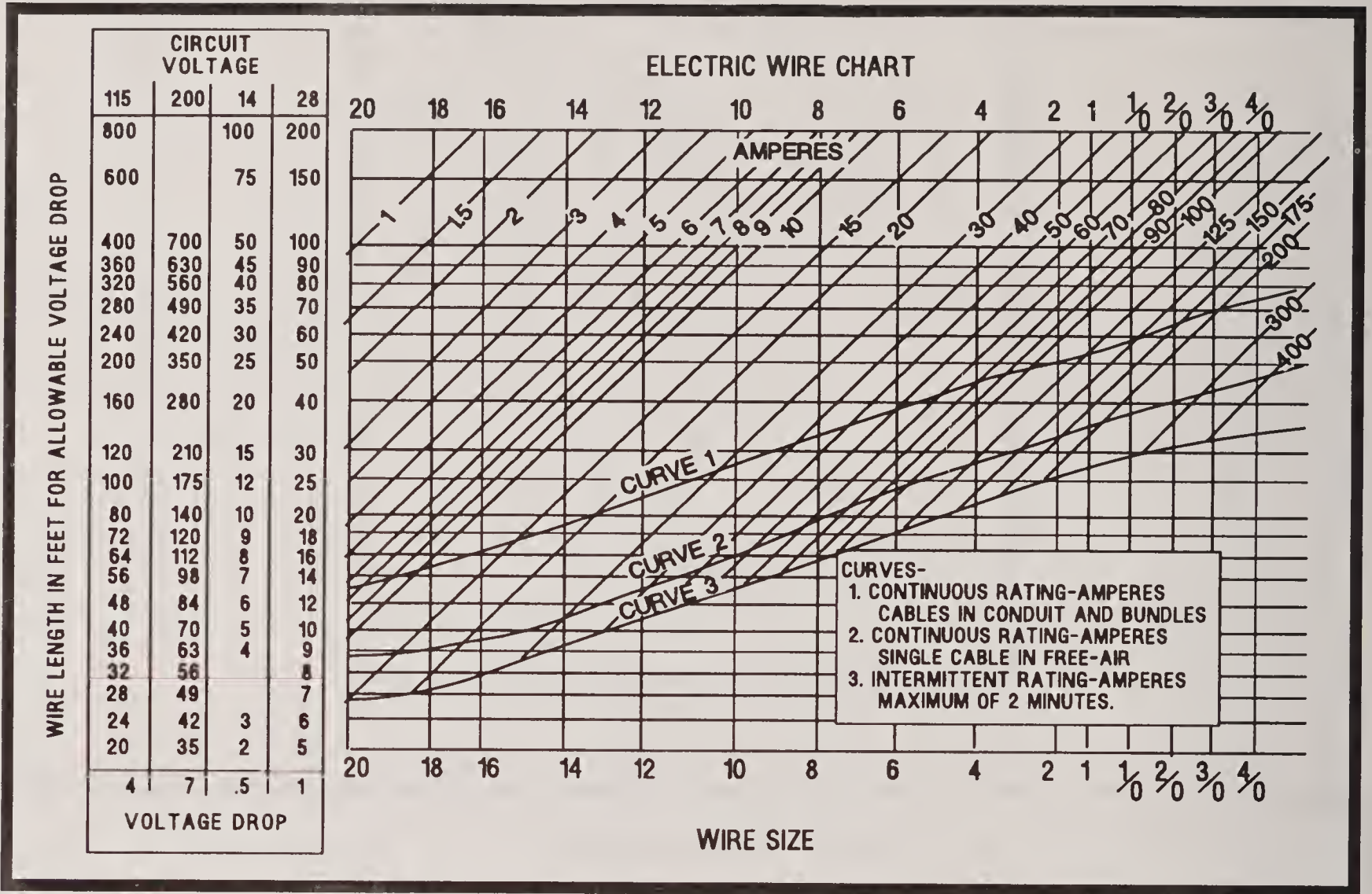


FIGURE 32.—Electric Wire Chart.

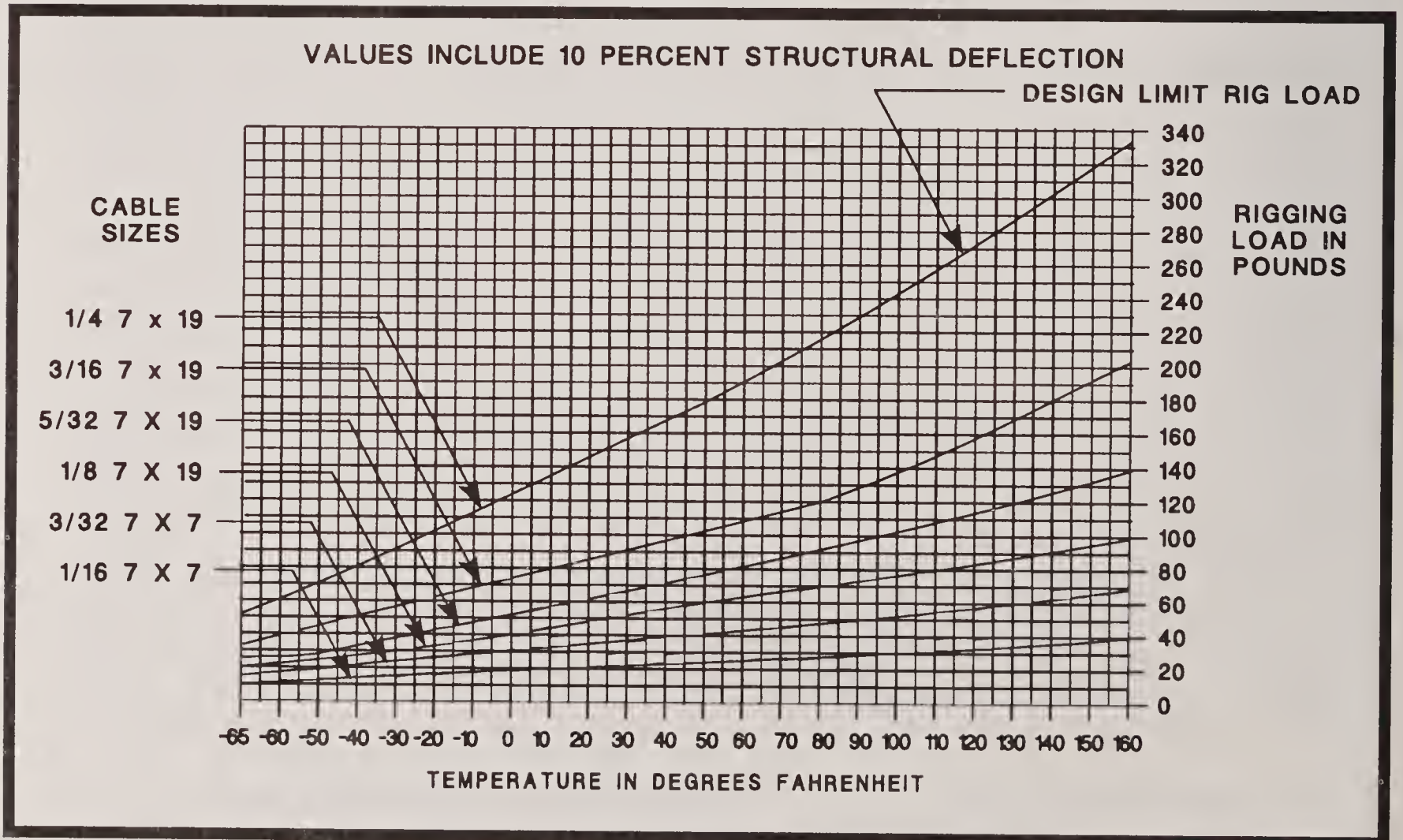


FIGURE 33.—Cable Tension Chart.

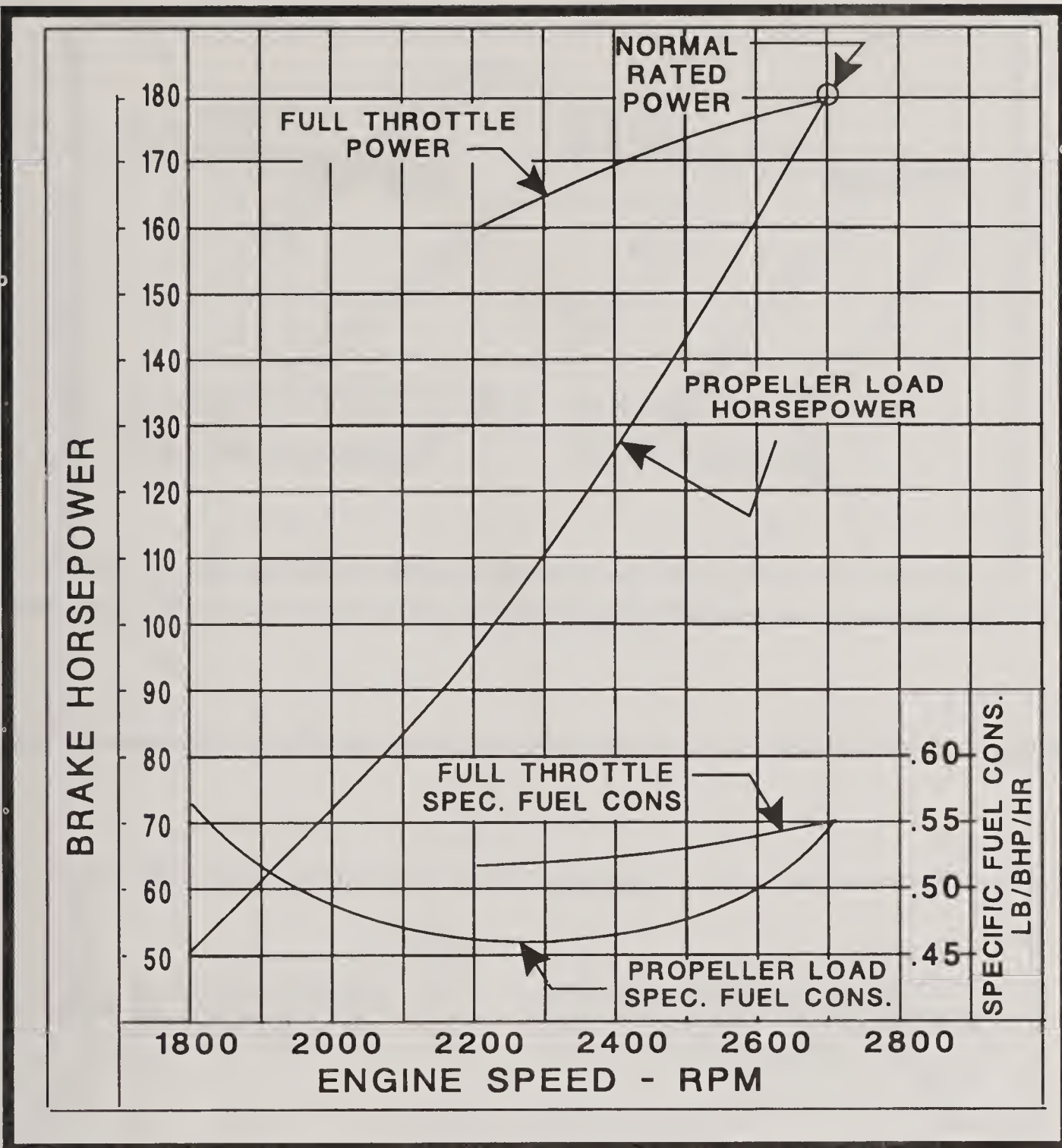


FIGURE 34.—Performance Chart.

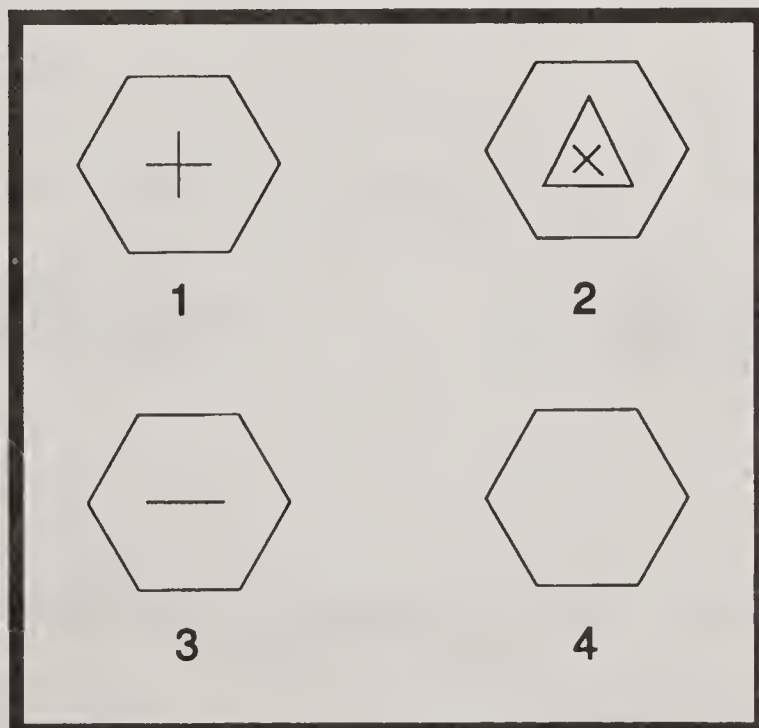


FIGURE 35.—Aircraft Hardware.



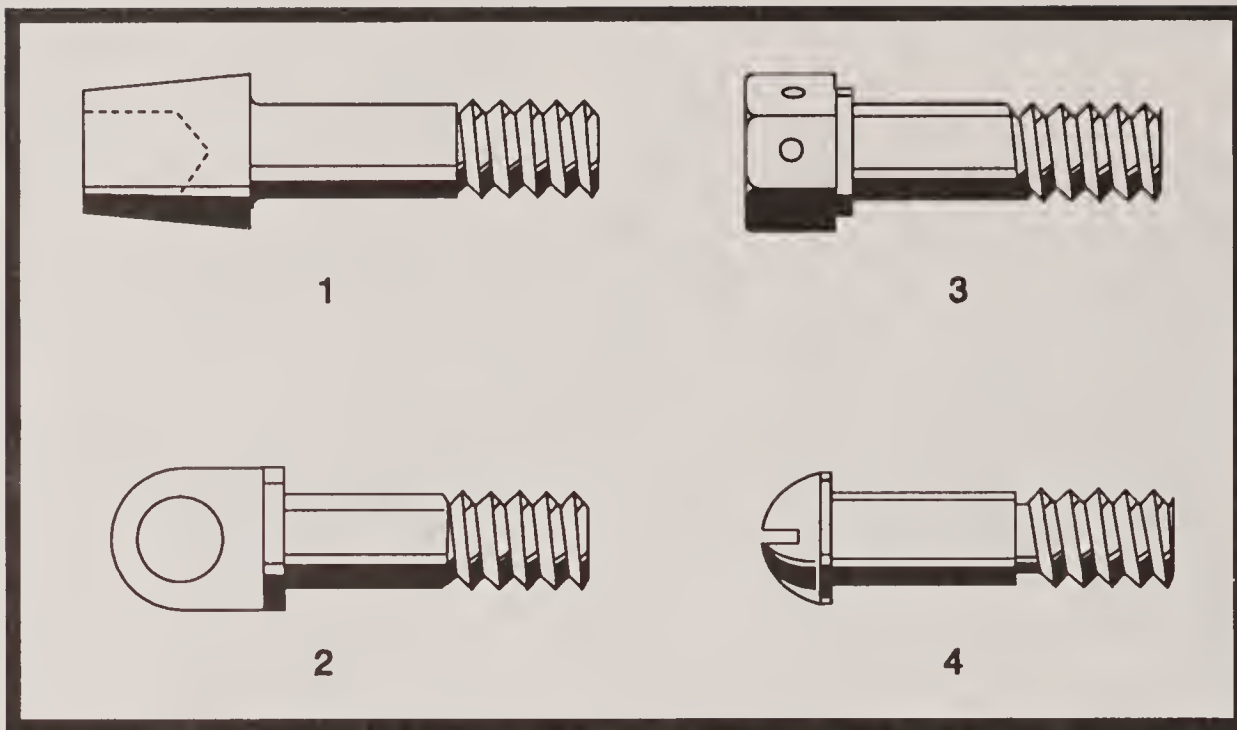


FIGURE 36.—Aircraft Hardware.

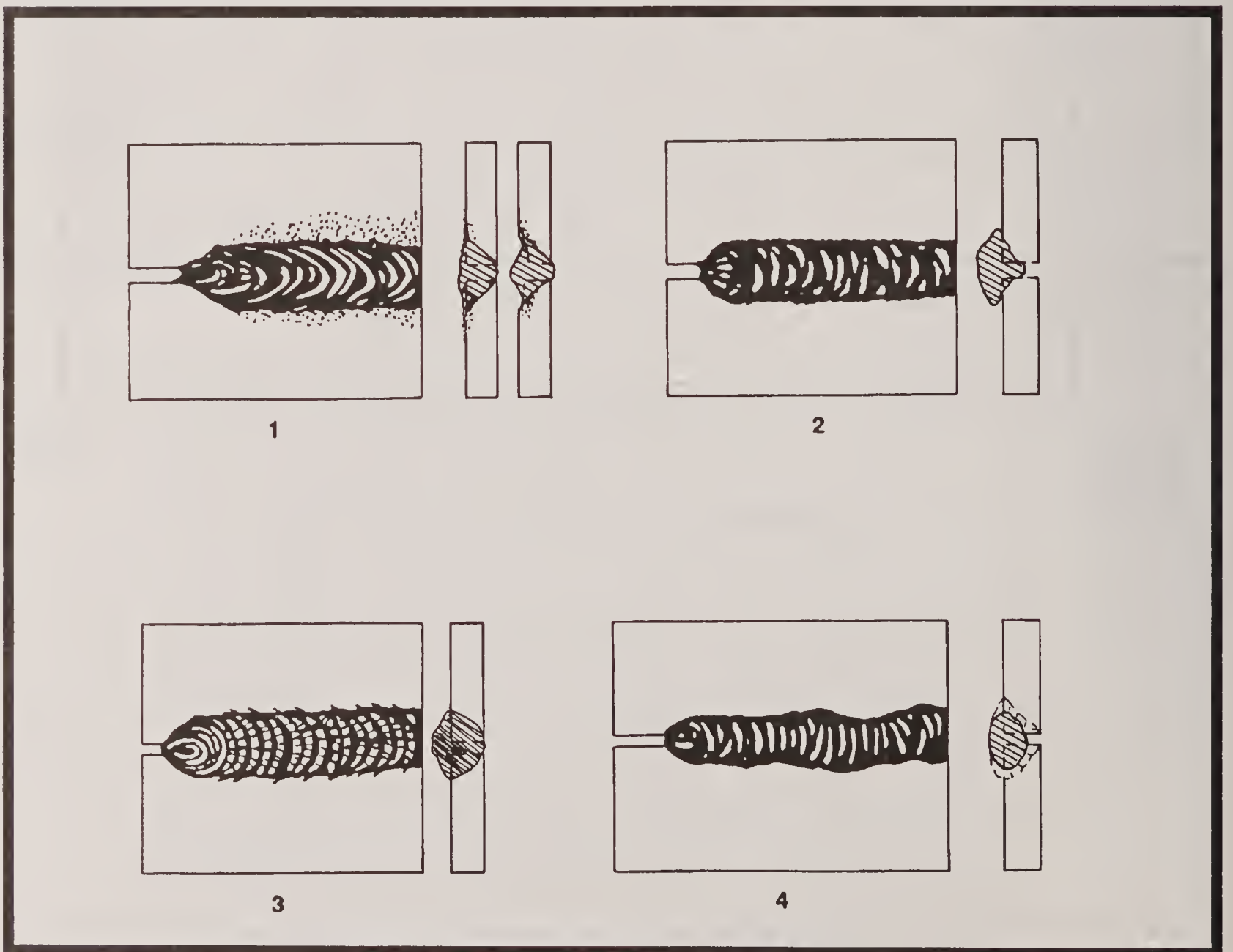


FIGURE 37.—Welds.



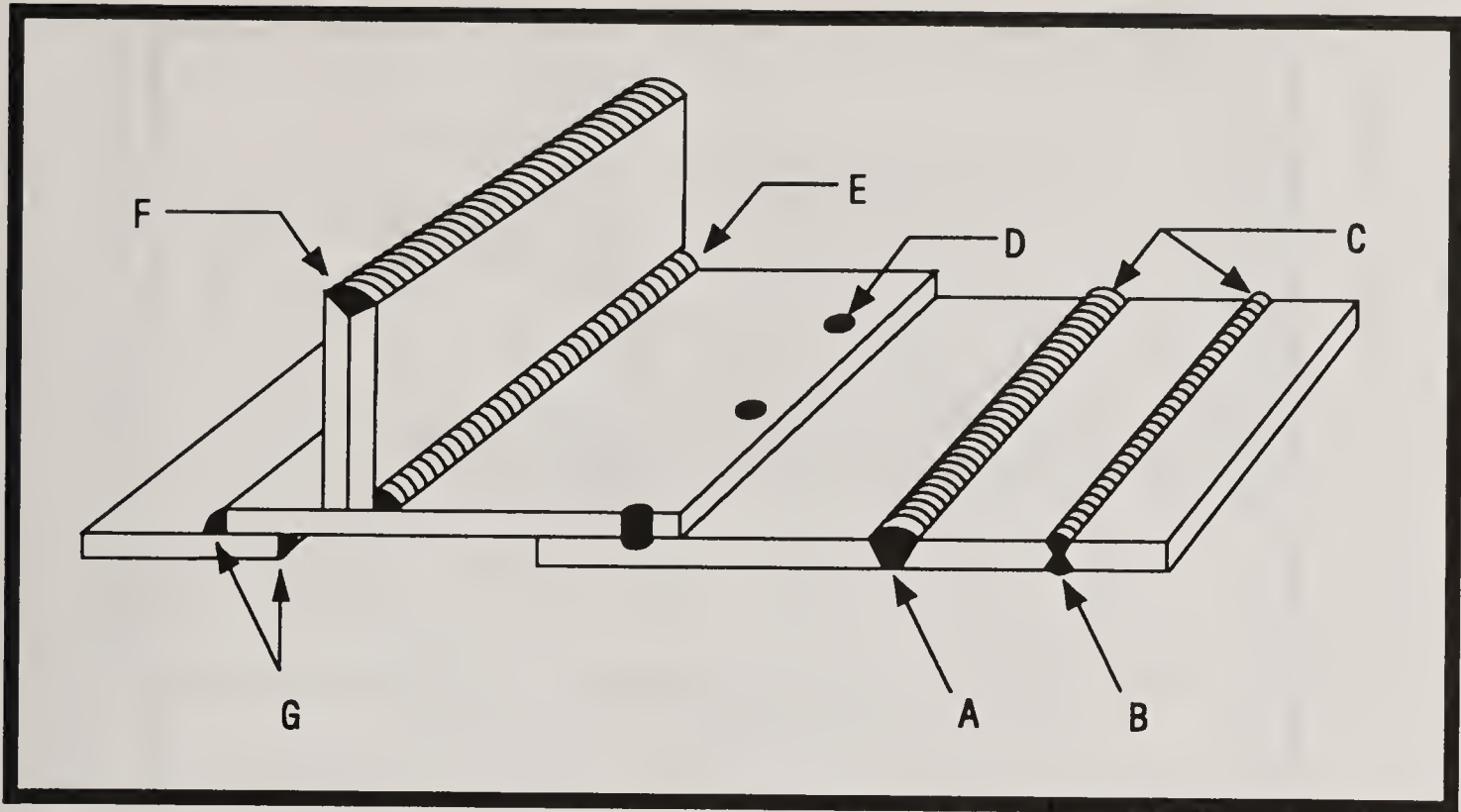


FIGURE 38.—Welds.

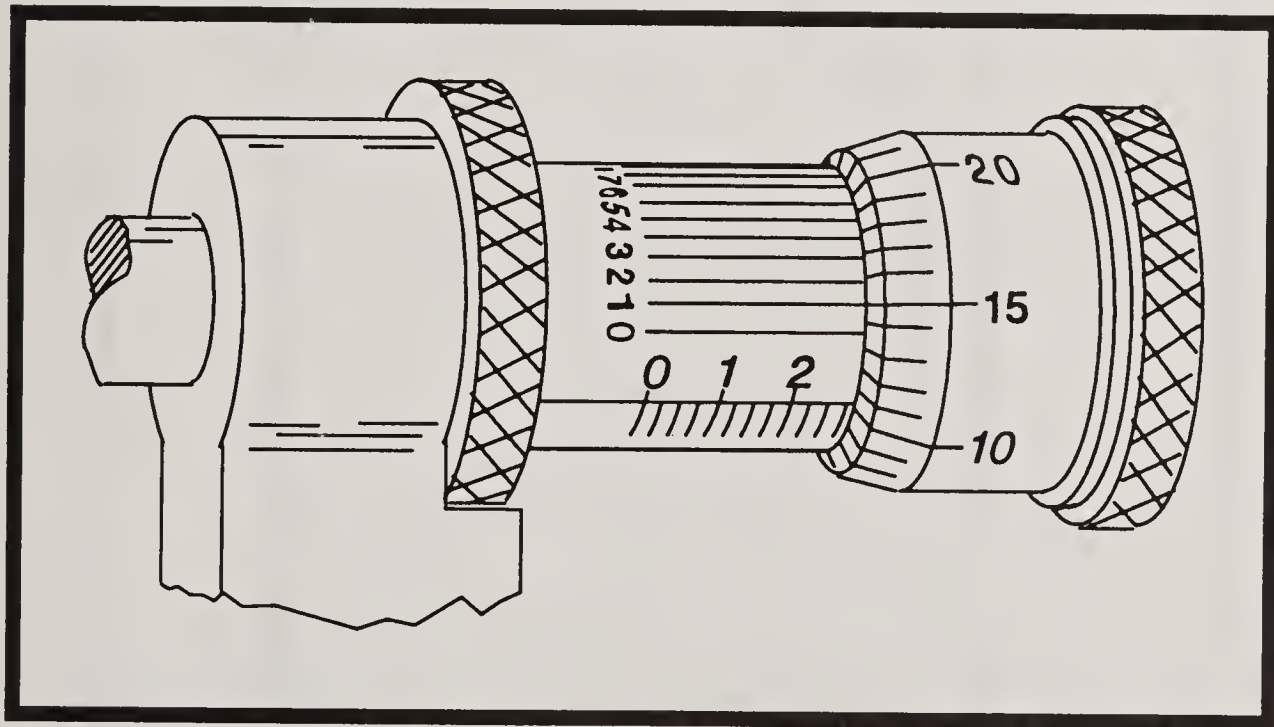


FIGURE 39.—Precision Measurement.

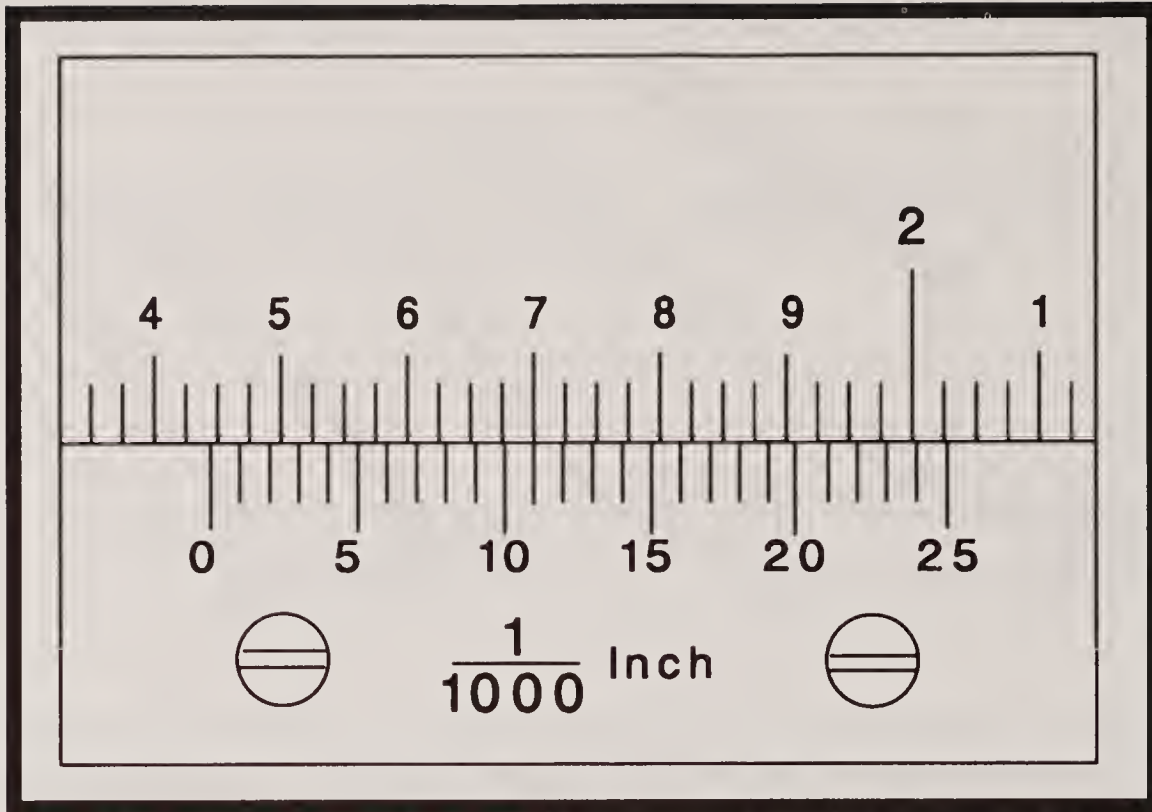


FIGURE 40.—Precision Measurement.

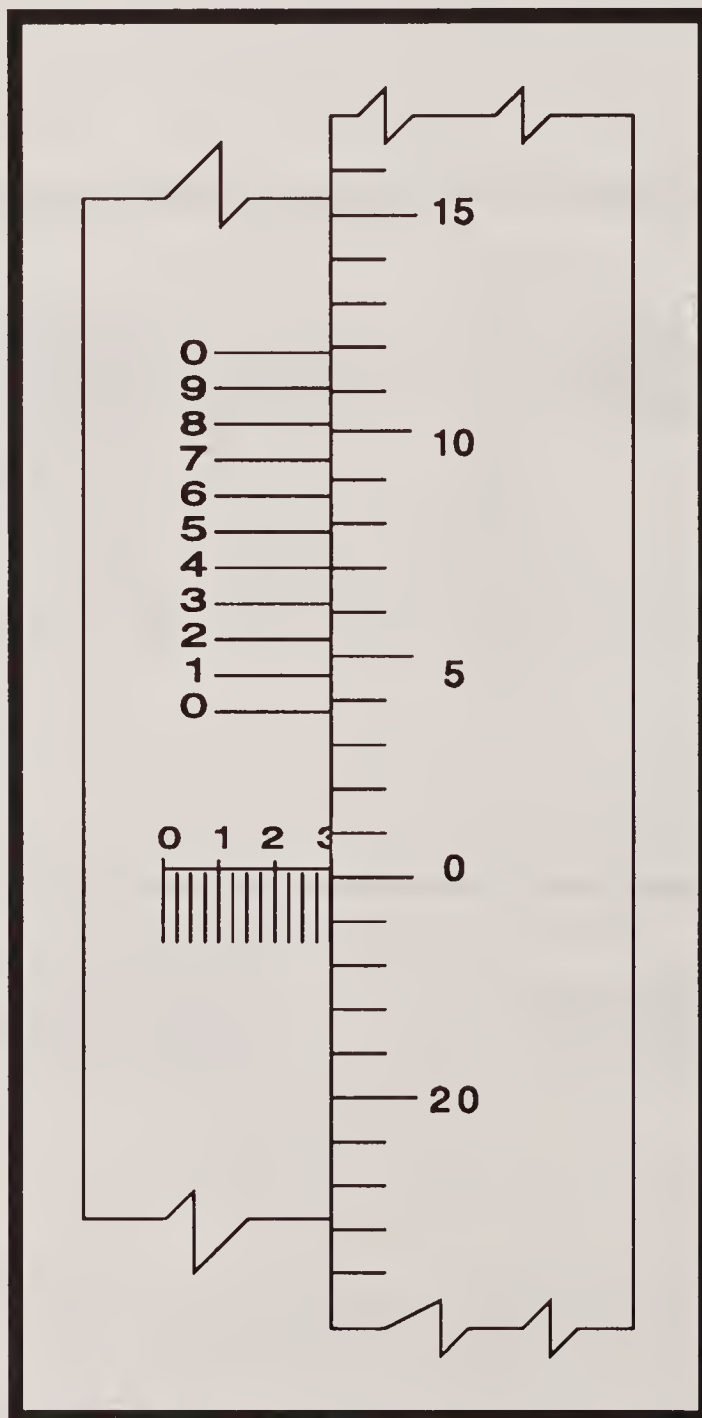


FIGURE 41.—Precision Measurement.

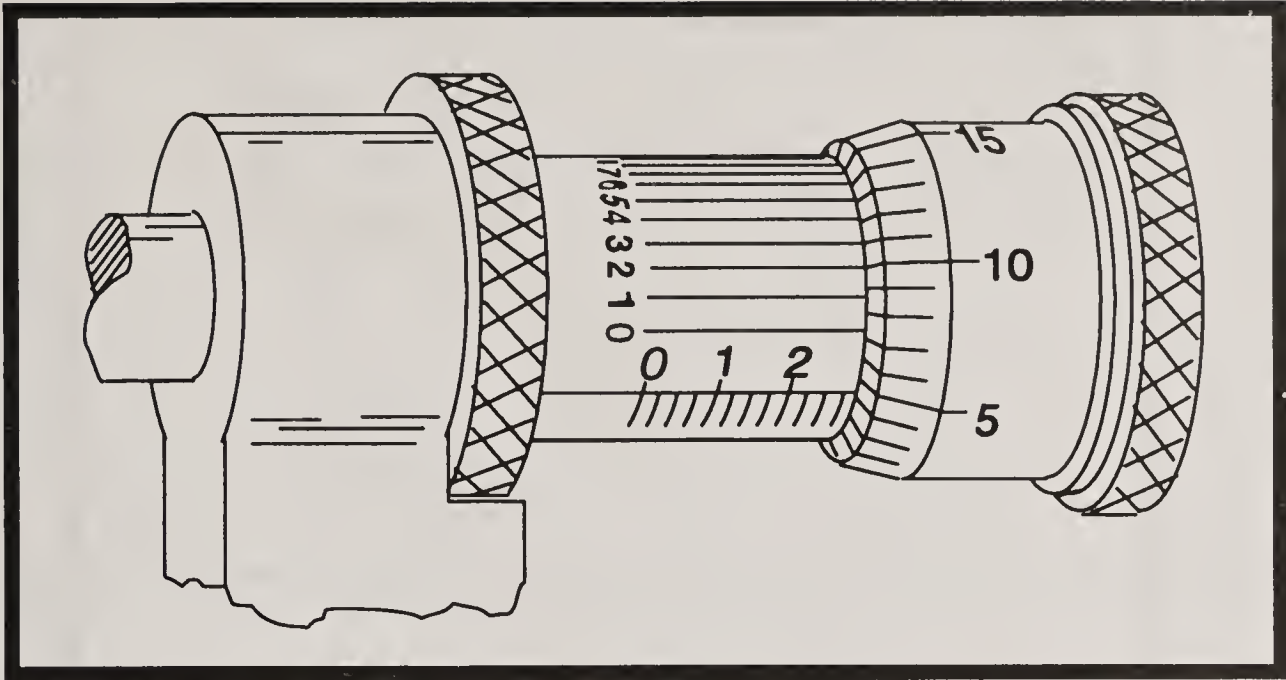


FIGURE 42.—Precision Measurement.

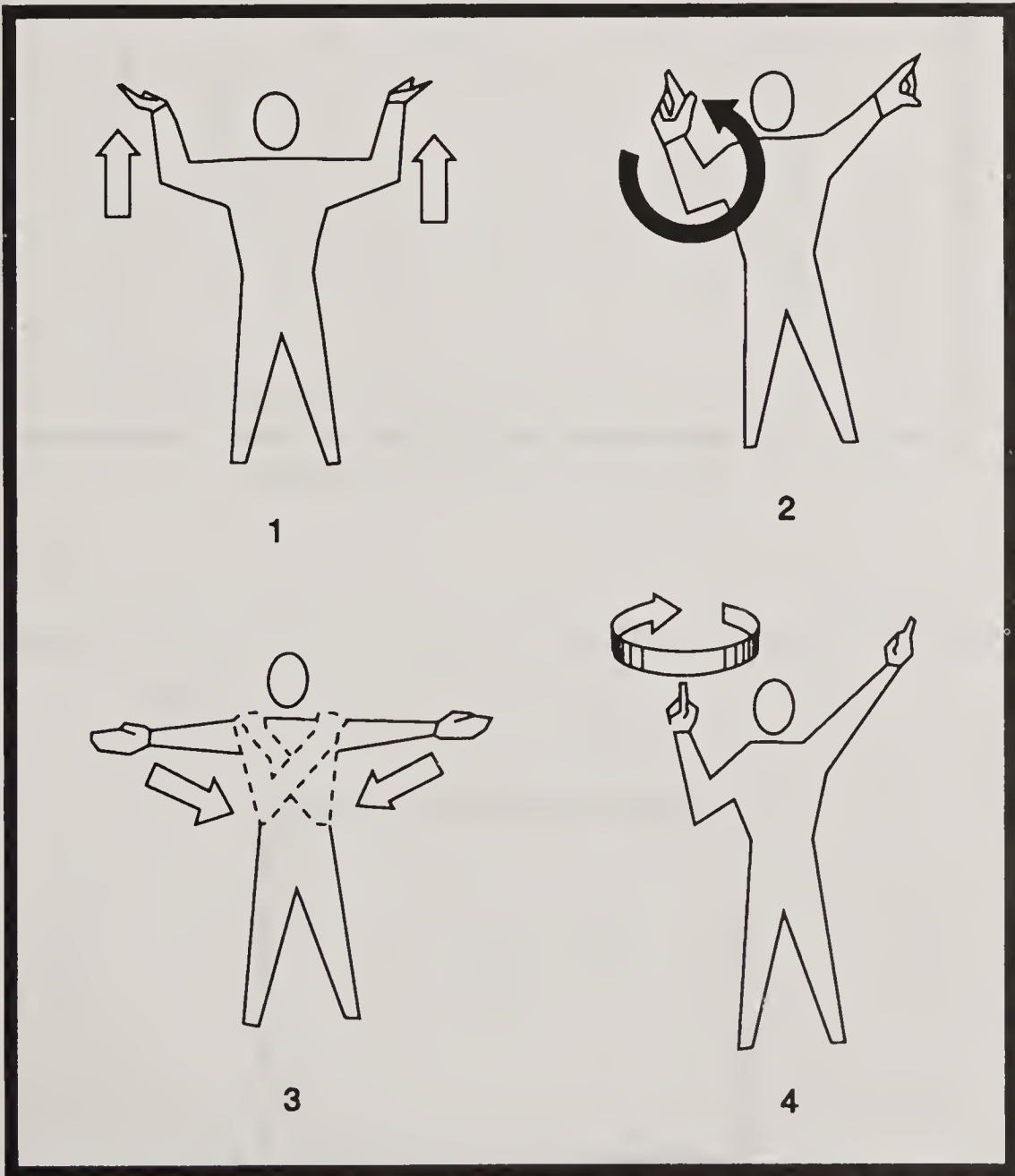


FIGURE 43.—Marshalling Signals.



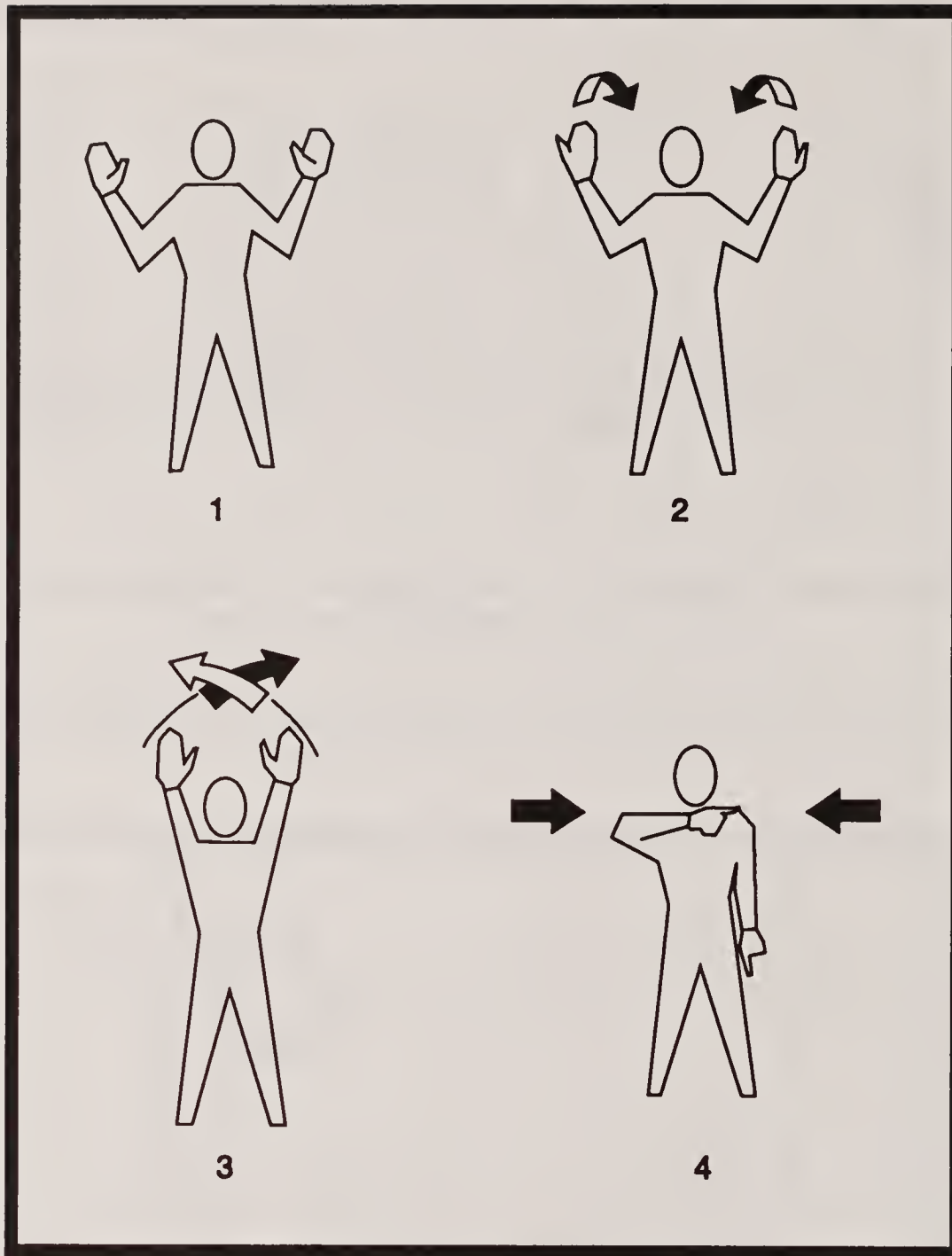


FIGURE 44.—Marshalling Signals.

$$\frac{\sqrt[2]{31} + \sqrt[2]{43}}{(17)^2}$$

FIGURE 45.—Equation.

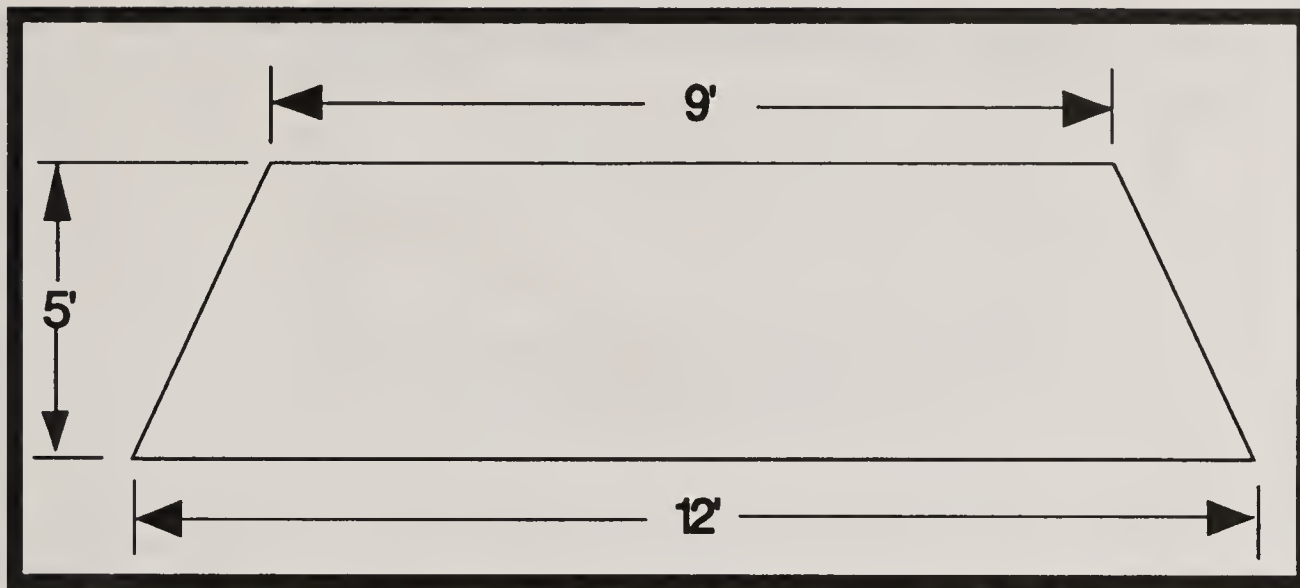


FIGURE 46.—Trapezoid Area.

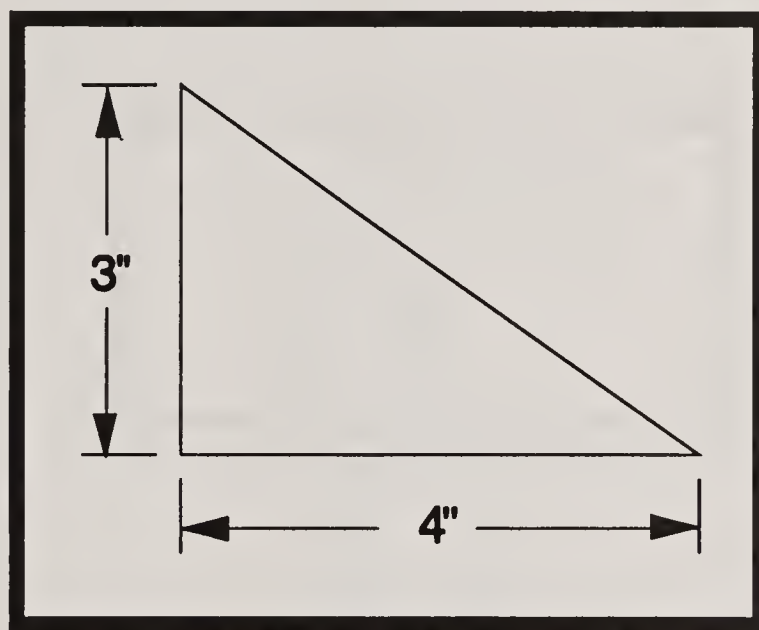


FIGURE 47.—Triangle Area.

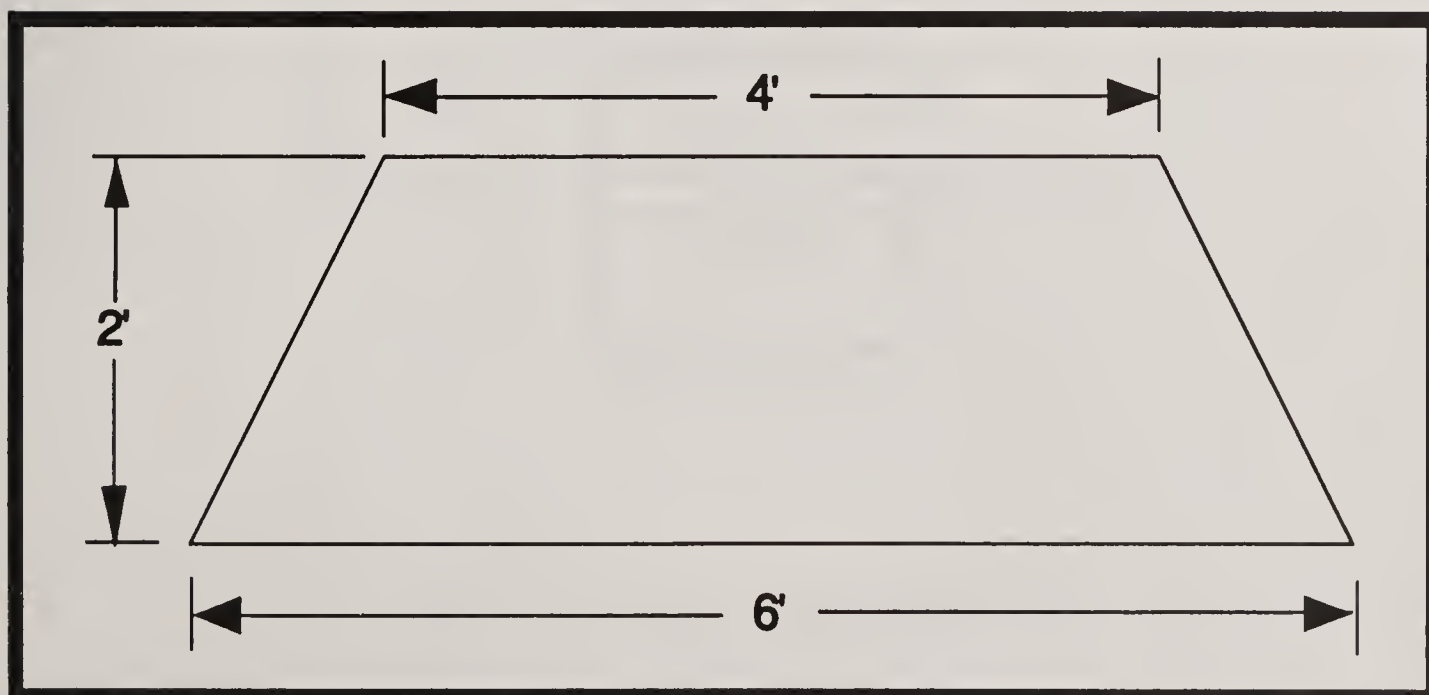


FIGURE 48.—Trapezoid Area.

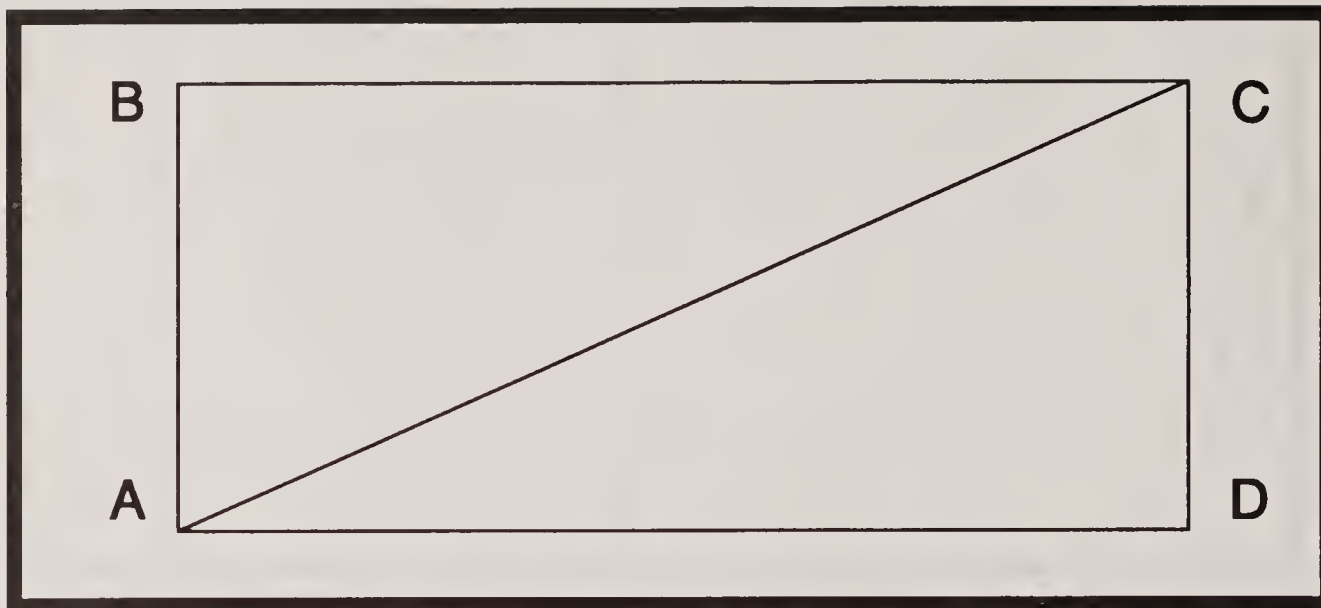


FIGURE 49.—Triangle Area.

$$\frac{(-35 + 25)(-7) + (\Pi)(16^{-2})}{\sqrt{25}}$$

FIGURE 50.—Equation.

$$\frac{-4 \sqrt{125}}{-6 \sqrt{-36}}$$

FIGURE 51.—Equation.



$$\frac{(-5 + 23)(-2) + (3^{-3})(\sqrt{64})}{-27 \div 9}$$

FIGURE 52.—Equation.

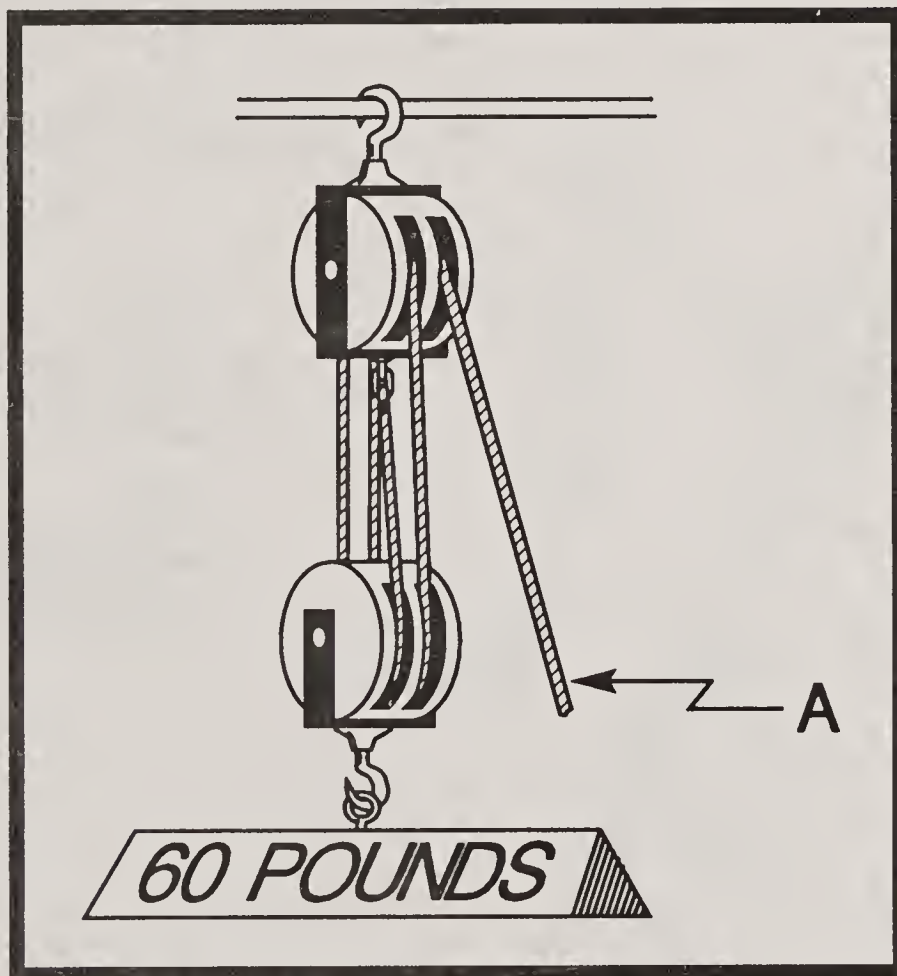
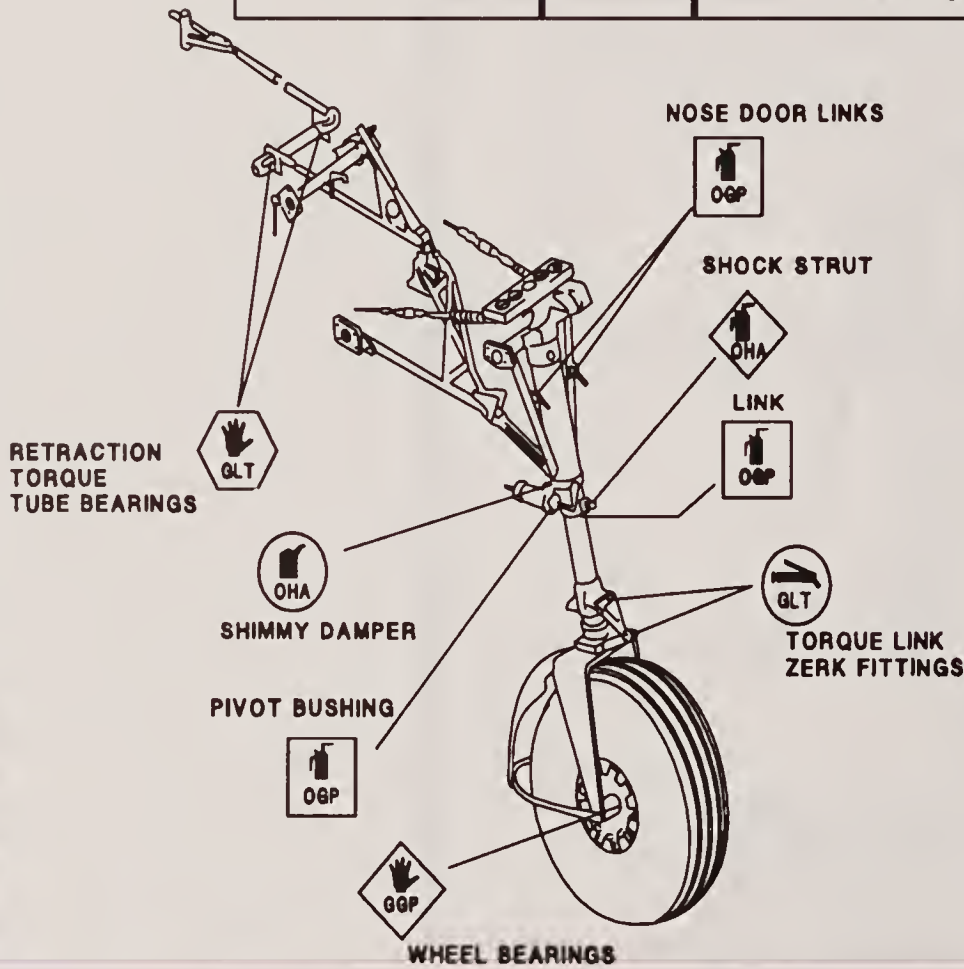


FIGURE 53.—Physics.

FREQUENCY	METHOD	TYPE OF LUBRICANT
○ 50 HOUR	✋ HAND	GGP.....Grease, General Purpose
□ 100 HOUR	🧴 SQUIRT CAN	GLT.....Grease, Low Temperature Aircraft Lubricating (Low Volatility Type)
◇ 500 HOUR	🧴 FILLER CAN	OGP.....Oil, General Purpose, Low Temperature Lubricating
⬡ 1000 HOUR	🧴 GREASE GUN	OHA.....Hydraulic Fluid, Petroleum Base
⬢ ON ASSEMBLY		FG.....Graphite, Lubricating
		OAI.....Oil, Lubricating Aircraft Instrument (Low Volatility)
		P.....Petrolatum or Terminal Grease
		OEA.....Oil, Lubricating, Aircraft Engine. Aviation Grade Straight Mineral Oil SAE 50 above 40°F SAE 30 Below 40°F Grade 1100 above 40°F Grade 1065 below 40°F If detergent oil is used after the first 25 hours of operation, it must conform to Continental Motors Specification MHS-24A.

Where OEA is shown with Squirt can, use SAE 20.



## NOSE GEAR LINKAGE

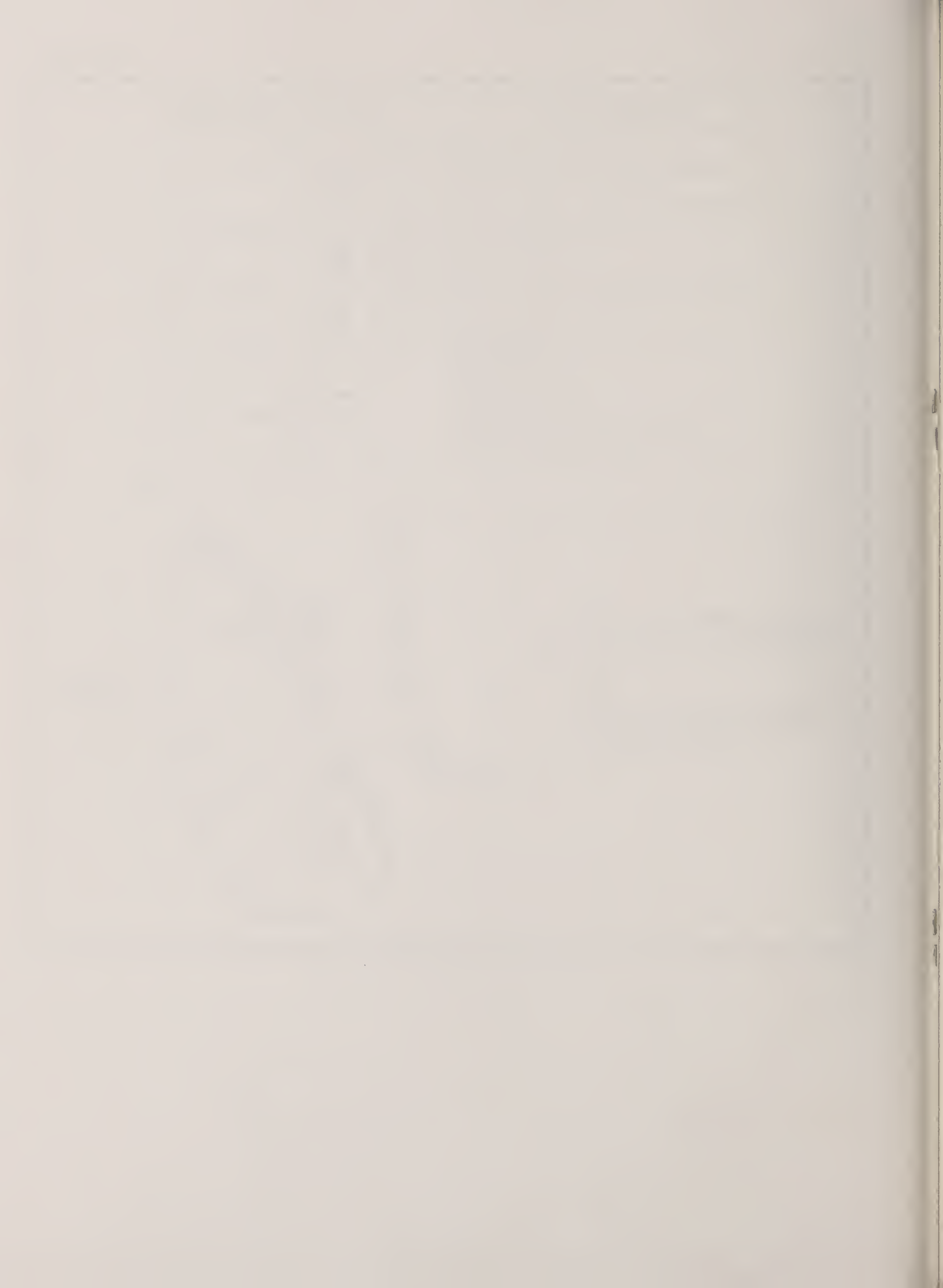
NOTE;  
LUBRICATE ALL SPHERICAL ROD ENDS WITH A MIXTURE OF LOW TEMPERATURE AIRCRAFT LUBRICATING GREASE AND MOLY-KOTE.

NOTE:  
WIPE POLISHED SURFACE OF LANDING GEAR SHOCK STRUT WITH A CLEAN CLOTH MOISTENED IN HYDRAULIC FLUID EVERY 50 HOURS.

FIGURE 54.—Maintenance Publication.



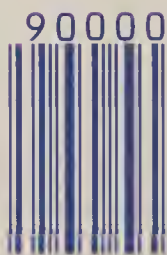
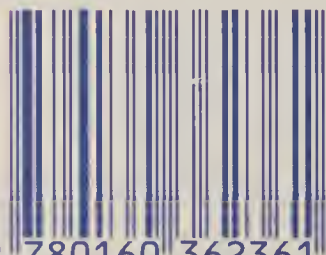








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